PAPER TRADE
JOURNAL

- *Where Does the Pneumatic Conveyor Fit In?*
- *A Study of Basic Pulping Principles*

August 1, 1955

WOOD PULP

G

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TENNYSON

Each of us builds his own approach to the world on his personal arch of experience. But our observations are sharpened and enriched when the experiences of others are set down on paper, the product of the Pulp and Paper Industry, to become part of our own.

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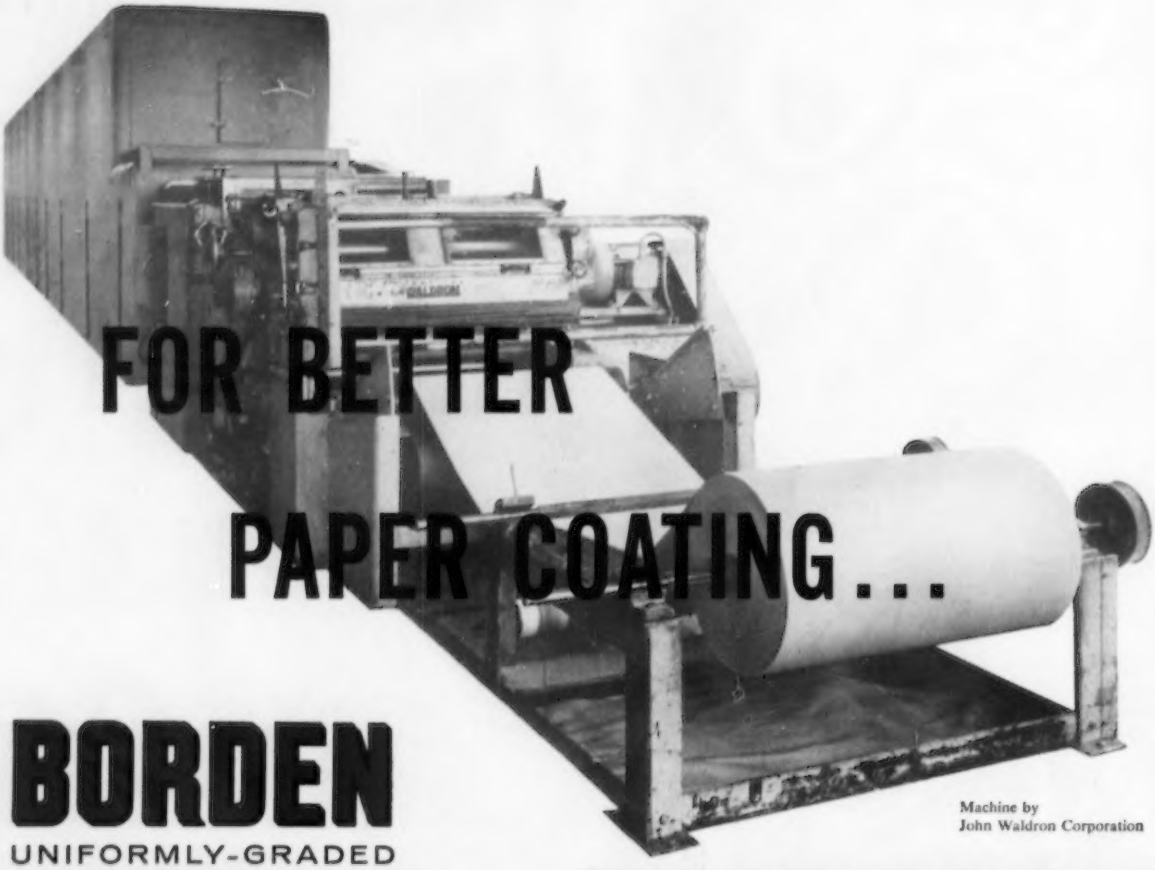

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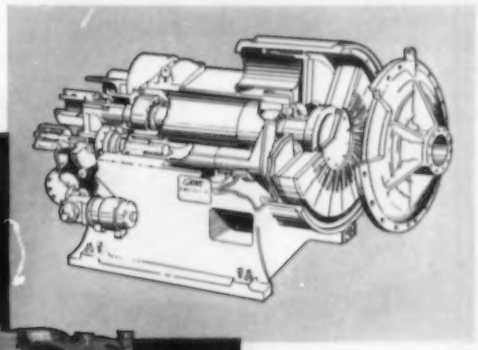

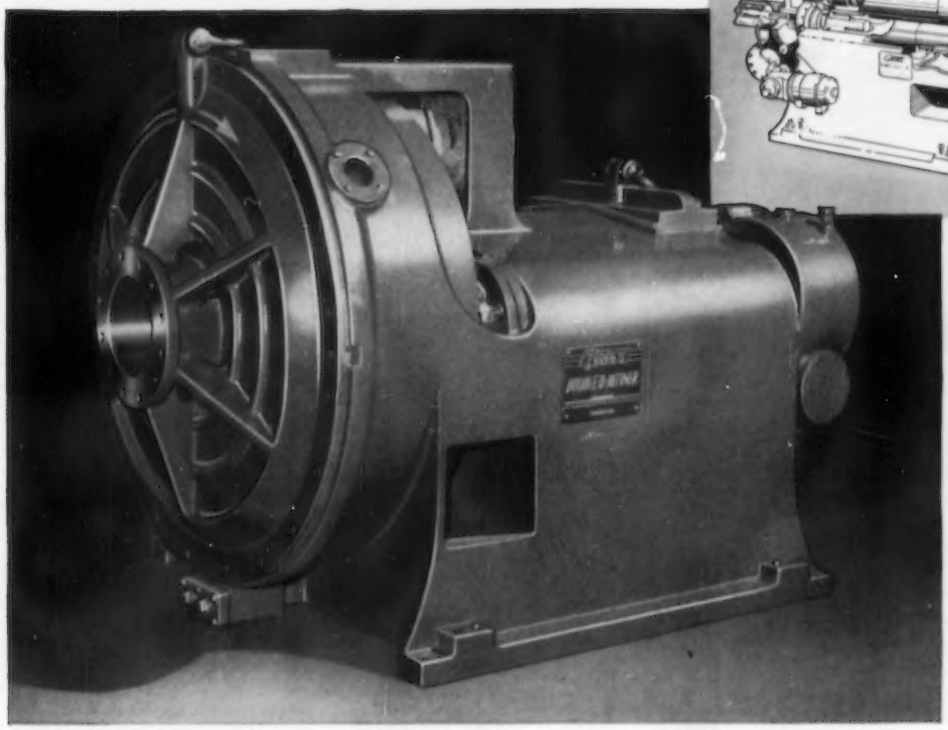

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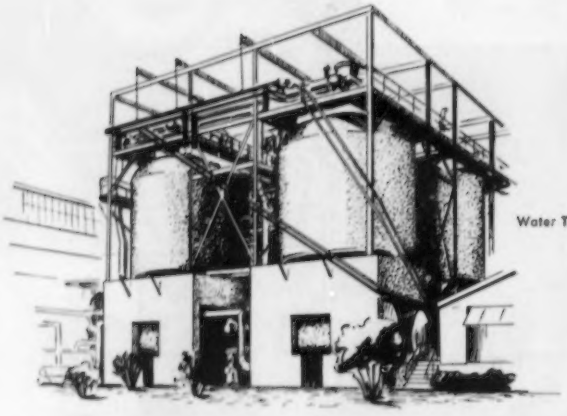

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REMEMBER THESE DATES

SEPT. 19-22: International Mechanical Pulping Conference, Poland Spring House, Poland Spring, Maine.

SEPT. 19-21: National Paper Trade Assn., Conrad Hilton Hotel, Chicago,

SEPT. 28-30: Testing Conference, Hotel Sheraton-Kimball, Springfield, Mass.

OCT. 19-21: Alkaline Pulping Conference, Hotel Patton, Chattanooga, Tenn.

OCT. 31-NOV. 3: Engineering Conference, Rice Hotel, Houston, Texas.

PAPER TRADE JOURNAL

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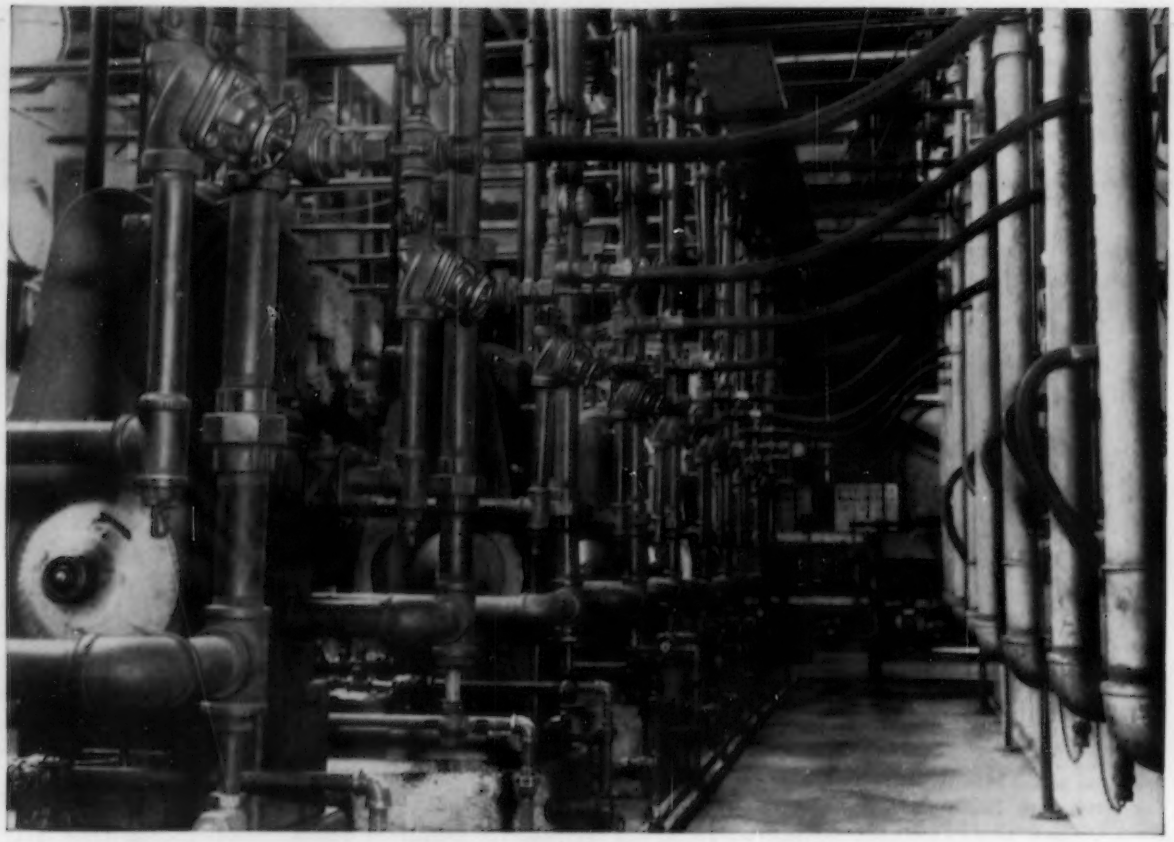

Holding high vacuum with low upkeep is routine for these CRANE VALVES

At the Crosley & Bendix Home Appliance Divs., Avco Mfg. Corp. refrigerator plant at Richmond, Ind., a line vacuum within a few microns of absolute is applied to a dehydration process. But holding this vacuum wasn't always a routine operation.

There was a time when frequent valve failures caused production losses and costly maintenance—stopped only when Crane Packless Diaphragm Valves were installed.

Of the valves formerly used, a multiple metal diaphragm type lasted about 3 months. Crowning of diaphragms caused restriction or closure and made the valves inoperable. Damaged diaphragms meant complete valve replacements.

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CRANE'S FIRST CENTURY...1855-1955

Very Gradual Process!

Great Northern Paper Co. and the Northern Division of International Paper Co. are reported to have agreed to "study" the four-day work week, which the Paper Makers, AFL, have announced will be a "formal goal" during next year's contract talks. The union plan includes four 8-hour days in mills operating continuously, with a fifth day's work every third week. The average for the three day cycle would be 33.6 hours per week. A 25 per cent increase in pay scales was also suggested so that reductions in time worked would not be accompanied by reductions in take-home pay! Acceptance of the plan was expected to be a *gradual* process.

Business Weather

Figures for paperboard production, a good industrial barometer, indicate sunny business weather for the balance of 1955. Last week, new orders increased 1 per cent from early July and were 19 per cent above 1954. The backlog of unfilled orders is currently 56 per cent over last year's levels.

Supplies Tight

"Credit the tight supply of old corrugated waste paper to buyers from France and Italy," president Anthony S. Gaccione of Toga Paper Stock Co. said. "Paper packaging is fast spreading throughout these countries and their demand for our corrugated supplies has cleaned the market, causing the present tight situation and the $16 advance over the past few months."

Imports Rise

Cumulative imports of dutiable papers and paperboards, for five months of 1955, have increased $4 million in dollar value from 1954, Warren B. Bullock, Import Committee manager, announced. Principal items responsible for the rise are kraft wrapping paper, paperboards and pulpboards. Decreases are noted for the same period in test liners, crepe paper, vegetable parchment and greaseproof papers.

Most Trees

The U. S. woodpulp, paper and board industry is by far the world's largest commercial owner of forest lands, the Department of Commerce announced. Holdings at present total more than 30 million acres and are supervised by more than 1,000 technical foresters. The Government has also recognized the integration trend of pulp, paper and board mills with lumber, plywood and veneer mill operations, brought on in the last few years by developments for the utilization of sawmill and logging waste for pulp manufacture.

Mill Stocks Up

Wastepaper stock inventories at Eastern consuming mills were increased 25 per cent during the vacation shut-down, Director Colley S. Baker reports. Also noted was the improved quality of the tonnage received at this time. Mills, it was stated, insist they will continue to buy only top quality packings this summer.

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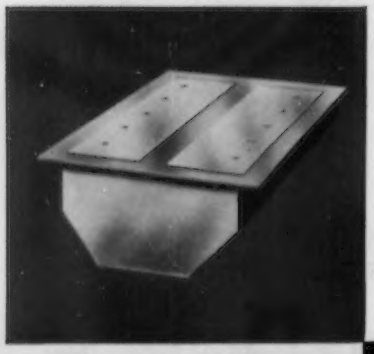
PREVENTION: Emerson Permanent Magnetic Separation Equipment prevents work stoppages and damage to your vital machines with the proper equipment to remove foreign materials from all stock conveying systems.



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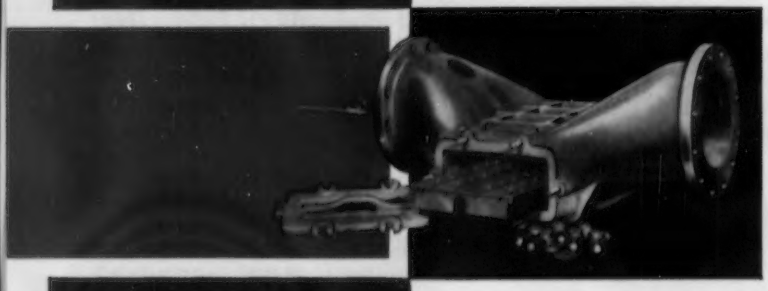
Adaptable for a wide variety of independent installations in pipes, ducts, lines, flow boxes, head boxes, belts, conveyors, troughs or on machines. Three standard types — for moderate, intermediate and extreme junk metal separation requirements. All magnets cast of super-strength Hyflux Alnico V, and completely enclosed in plate housing of non-magnetic stainless steel.



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Designed for stock line installation for all moderate separation requirements. All stock is directed to the magnetic field at an angle and retained before continuing, with no restriction to the flow. Tramp metal is collected on the plates for easy, periodic cleaning.

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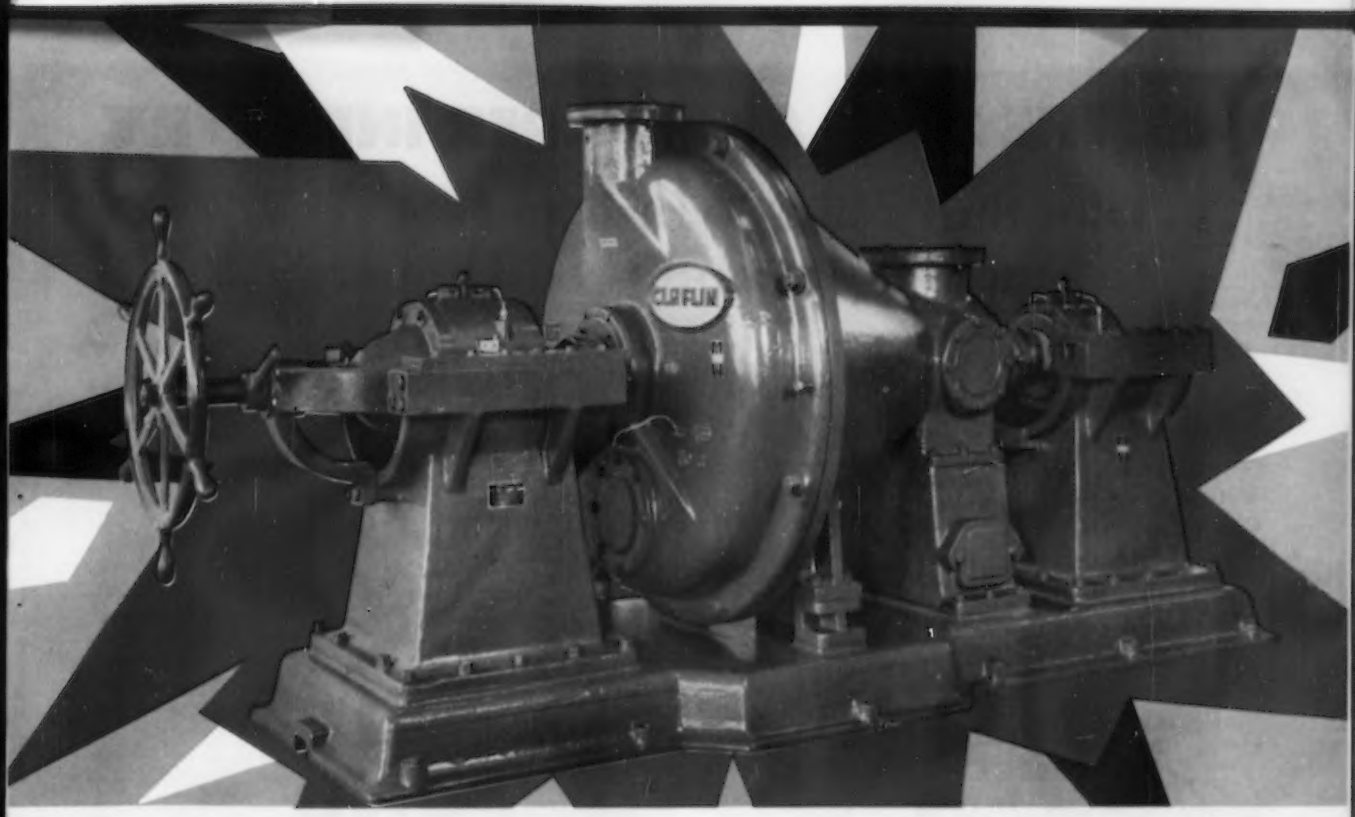

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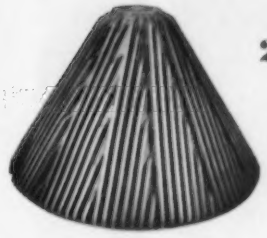

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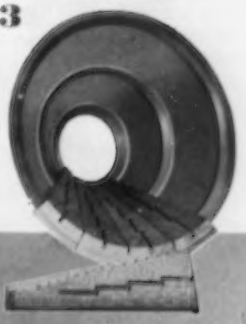

3 **Hydrating Shell and Alloy Iron Plug Fillings** — for producing the light brush of extreme fibrillation with a minimum of cutting. Plug fillings available with or without wood fillers in 3/8", 1/2" and 3/4" widths.

For extreme hydration — a lava plug and hydrating shell.

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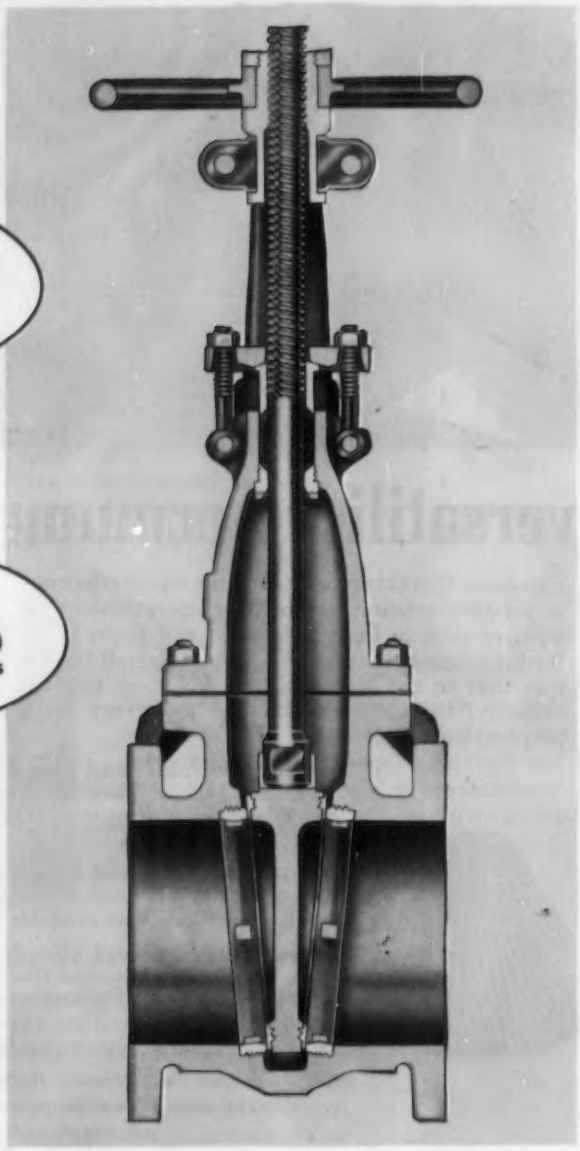

Your nearby OIC Valve distributor will advise you on trim best able to meet the corrosive conditions you have. These valves and the services for which they are intended are described in Bulletin No. 1000. Write for a free copy.

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Coos Bay Expansion Permits Use of Alder

The installation of a new pulpwood preparation plant and supporting equipment at the Anacortes, Wash., mill of the Coos Bay Pulp Corp. now permits the mill to use substantial quantities of alderwood in the manufacture of bleached sulphite pulp. This major expansion program was started in February of this year and provides for the handling of alder either by truck or by freight car delivery to the mill. The new wood room has been erected on ground adjacent to the existing pulp mill.

In addition to the wood preparation equipment, new construction also provides facilities for the improved purification of pulp. Stock and caustic soda storage tanks, together with a new building to house the equipment, have been installed.

Of special interest is the operation of two mechanical barkers especially constructed for the peeling of logs. One of these barkers has been operating at the mill on a trial basis for a number of months. (See "First Operating Report of the Burnt River Barker," *Paper Trade JOURNAL*, Sept. 10, '54.) Logs are carried through the barker on trunnion wheels which rotate the log. The bark is removed by side heads with angled teeth. Rotating wire brushes located behind the heads, remove the layers of bark.

Other equipment installed in the new debarking plant includes a 112-inch log chipper; conveyors; and chip feeders. Auxiliary equipment and construction include a truck unloading ramp; wood storage areas; railroad track spur; large crane for the handling of wood.

The Coos Bay Pulp Corp. is a wholly-owned subsidiary of Scott Paper Co. The major portion of the plant's production will be shipped to the new Scott paper mill at Everett, Washington. Here Anacortes pulp will be used in conjunction with pulp produced at Everett in the manufacture of Scott sanitary papers.

The new facilities, which will be operated in conjunction with existing equipment, will result in an increase in the annual production of the mill. The technical and engineering staffs of the plant have been augmented to handle the anticipated increase.

Start Building Port Hueneme Mill

Work has begun in preparation for construction of a $1,500,000 pulp and paper mill on Perkins Road south of Hueneme Road, Port Hueneme, Calif., for Kalof & Co.

The corrugated iron and steel structure, to provide more than 300,000 sq. ft. of floor space, will house a machine 400 feet long to convert wood pulp into finished paper products, it was said.

Construction will be in charge of Robert Stevens. Steel work will be by the Dudley Steel Corp., Southgate, Calif., and concrete work by Byers and Enyart of Ventura, Calif. Completion is planned for December 1955.

Pulpwood Sale May Bring Pulp Mill to New Mexico

The first pulpwood sale "of any consequence" in the Southwest will be held in Albuquerque August 25, the U.S. Forest Service has announced.

Dahl Kirkpatrick, assistant regional forester in charge of timber management, said an estimated 110,000 cords will be auctioned at 2 p.m. in the regional Forest Service office, 510 Second NW, Albuquerque, N. Mex.

The timber is designated for cutting in nearly 90,000 acres of the Lincoln National Forest near Alamogordo, and includes 65,000 cords of aspen, approximately 18,620 of ponderosa pine, 13,500 of Douglas fir and 10,000 of white fir.

The pulp will be of a type suitable for newsprint, felt or coarse grade paper, Kirkpatrick said.

Purchasers of the pulp will be required to build a mill, the forester said. At present there is only one pulp mill in the whole southwest—Coconino Pulp & Paper Co., Flagstaff, Ariz.

Certain-teed Dedicates New Roofing Plant

The new asphalt roofing plant which Certain-teed Products Corp., formally opened in Tacoma, Wash., on July 9, is the 17th for this company. Construction of the plant began just a week short of a year ago—on July 16, 1954—when the first pilings were sunk at the 11-acre site. The plant went into operation April 22, when the first run of asphalt-saturated felt was made.

The plant consists of 16,000-sq.-ft. factory building, a 32,000-sq.-ft. warehouse, a machine shop and a battery of five asphalt preparation stills. The site provides room for further expansion.

Design and construction supervision of the plant was under the direction of Certain-teed's own engineering staff. John A. Balen was the architectural engineer; Grant F. Mayell, project engineer, and Albert A. Adams, resident engineer. E. M. Costello is the plant superintendent. The Austin Co. was general contractor and Western Machine Works of Tacoma, Wash., was the contractor for installation and erection of machinery.

Champion May Explore Atomic Energy Uses

The Champion Paper and Fibre Co. disclosed its application to participate in the use of atomic energy for industrial purposes has been approved by the Atomic Energy Commission.

A spokesman for Champion said:

"A lot more companies also have been given access to hitherto secret atomic information. However, the people who will work with the information must pass security tests."

KVP MAKES WAR ON BUGS—Kalamazoo Vegetable Parchment Co. keeps mashed insects out of its food papers and other grades by an intensive pest control program. Specialists of the Industrial Pest Control Service inspect and spray nearby fields and plant interiors frequently. Vital areas are tested weekly. If more than two insects per square foot are found, spraying begins immediately.

Work Starts on New MacMillan & Bloedel Mills

Construction was started July 13 on MacMillan & Bloedel, Ltd., newsprint, kraft and paperboard mills at Port Alberni, Vancouver Island, B.C.

The newsprint mill, expected to start production during the first quarter of 1957, will produce about 100,000 tons annually, 75 percent to 90 percent of which will be exported. The mill will be large enough to permit adding a second machine at a later date.

The multi-purpose kraft mill will produce about 60,000 tons annually, starting last quarter of 1956.

Other developments in the company's $35 million expansion program include enlarging its pulp mill from 250 tons daily to 400 tons and deep sea wharf to serve pulp mill and two paper mills.

Bowaters Southern Raises Funds for Expansion

Bowaters Southern Paper Corp. has obtained the necessary capital to proceed with its projected expansion of the Calhoun, Tenn. mill. The company has entered into agreements with twelve U.S. insurance companies for the sale of up to $15 million of 4¼ per cent sinking fund first mortgage bonds, series B, due May 1, 1976. The financing was arranged through Morgan Stanley & Co. Bowaters Southern has also entered into a credit agreement with a group of four banks headed by J. P. Morgan & Co. Incorporated for the issuance of up to $5 million of its 3¼ per cent notes due January 1, 1958, to January 1, 1962, inclusive.

The Calhoun plant is presently operating at an annual rate of approximately 160,000 tons of newsprint and in addition about 65,000 tons of semi-bleached kraft pulp. The new money, together with other funds provided from within The Bowater Organization, will be used to add a third newsprint machine with the necessary digesters, grinders and auxiliary equipment and to enlarge power and steam generating facilities. It is expected that the completion of the expansion program will increase the rated capacity of the mills on an annual basis to about 275,000 tons of newsprint.

Paper and Board Production

According to the American Paper and Pulp Association, the ratio of the United States paper production to mill capacity for the week ending July 16, 1955, was 89.7 percent, compared with 62.7 percent revised, for the preceding week. The ratio was 84.3 percent for the corresponding week a year ago. Mills producing newsprint exclusively are not included.

The paperboard production ratio for the week ending July 16, 1955, was 77 percent, compared with 55 percent for the preceding week, and 71 percent for the corresponding week last year.

(Detailed statistics on page 50.)

National Gypsum Increases Expansion Plans $20 Million

National Gypsum Co. has earmarked another $20 million for its expansion program, increasing the five-year total for the plan to $95 million. The company previously said the expansion would amount to $75 million.

The additional $20 million, which already has been appropriated, will be spent for machinery, additions to existing warehouses and labor-saving devices in most of the company's plants.

The company has 39 plants in operation, under construction, or planned this year. National Gypsum also expects to start building six more plants within the next two or three years in Toronto, Montreal, California and Mobile, Ala.

Franklin Paper Starts Up New Board Machine

Franklin Paper Co., Holyoke, Mass., has begun production on its new board machine. For several months installation of the machine has been carried on while production was maintained on the old board machine.

The new unit is a five-cylinder, 74-inch board machine, representing an investment of $500,000. It will double the capacity of Franklin to produce its line of corrugated medium, chip board, and kraft specialities. Franklin's old cylinder machine is being dismantled and will be sent to Mexico City, Mexico.

C-Z Announced Stock Split

The board of directors of Crown Zellerbach Corp. at a special meeting on July 20 voted a split-up of Crown Zellerbach common stock, and authorized the distribution to common stockholders of one additional full share of common stock for each two shares outstanding.

Solely for the purpose of convenience, this split-up will take the form of a 50 percent stock dividend which will be distributed by September 6, 1955, to common stockholders of record on August 19, 1955. The resulting increase in legal capital (equal to the $5 par value per share of all additional shares so issued) will be made by an appropriate transfer from Crown Zellerbach's capital surplus, without any change in the earned surplus account.

At the same time, Crown Zellerbach's directors stated their intention to increase cash dividends, after the completion of the proposed exchange of Crown Zellerbach's common shares in the contemplated Gaylord Container Corp. transaction announced on June 29, 1955, to an annual dividend rate of $1.80 per share, which would be equivalent to an annual dividend rate of $2.70 per share

on the presently outstanding common shares of Crown Zellerbach stock. As a result of the stock split-up the proposed exchange of Crown Zellerbach's common shares in the Gaylord transaction will be on a share-for share basis, instead of two full Crown Zellerbach common shares for three full Gaylord shares as previously announced.

Win S. D. Warren Scholarships

This year the S. D. Warren Scholarships went to William C. Christian and Eugene A. Waters, both of Westbrook, Maine.

The scholarships are granted each year to two outstanding Westbrook High School graduates, at least one of whom must be a boy. They are in the amount of $750 for each of four years, providing the recipient maintains a satisfactory standing in college.

To qualify for payment of the scholarship, the winner must attend a four-year degree-granting college of liberal arts, engineering, business administration, or similar institution.

Both of this year's boys were not only honor students but were well rounded in extra-curricular activities.

William Christian has been very active in band work, having played in the high school band during all four years. He was a member of the "44" Club. He was in prize speaking in his sophomore and junior years and in the school play in each of his last three years. In addition, he was in the All-State Band his senior year and was in the Regional Speaking Contest in his junior year. He plans to go to Bates College in the fall to study English and romance languages to prepare himself for a teaching career.

Gene Waters belonged to the "W" Club all four years at Westbrook High School. He was a member of the Key Club his last two years and president his senior year. He was on the baseball and football teams all four years and on the basketball team his first three years. He was a member of the student council and president of his class all four years. He was president of the Southwestern Maine Student Council. He is going to Bowdoin College in the fall.

S. D. Warren Company has nothing to do with selecting the winners nor is there any stipulation that parents must work at S. D. Warren Co. but the father of one of last year's winners, Owen Wood, and the father of one of this year's winners, Wilfrid Christian, not only work in the same department in the mill (the winder room) but they work opposite shifts on the same winding machine.

ROBERT JAMES TAKES HIS OATH as new Director of the Forest Products Division, Business & Defense Services Administration. Mr. James is on loan to BDSA from his position as sales manager of the Grand Rapids mills and folding box plant of American Box Board Co., and is serving without compensation from the government under a rotation system whereby experienced businessmen provide their services for periods of six months or longer. Accepting the oath is (left) BDSA Administrator Charles F. Honeywell.

E. W. Crawford, Jr.

East Texas Organizes Plant Tour System

As part of its community and industry relations program, East Texas Pulp & Paper Co. has organized a system of plant tours for interested persons.

Erwin Weeks Crawford, Jr., a teacher with the Silsbee, Texas school system, has been appointed official Plant Tour Guide. He has organized a full tour which requires an hour and a half to complete. The personnel department recently prepared a story of the Eastex plant which describes in lay terms the complete manufacturing process from pine to pulp. These pamphlets are given each person taking the plant tour.

Requests for tours come from technical personnel seeking special information, from students, citizens and civic organizations, as well as from tourists visiting the area.

St. Croix Establishes Scholarship Fund

St. Croix Paper Co., Woodland, Me., has established an annual scholarship award for a four year technical education at the University of Maine. The amount of each scholarship is $2,000 and will be awarded to qualifying students in mechanical, chemical, electrical engineering, forestry or pulp and paper technology.

St. Joe Acquires Jacksonville Property

The St. Joe Paper Co. has acquired on long-term lease an old business structure in Jacksonville, Fla., which gives it an entire city block in the heart of the business section.

Reports have long persisted in Jacksonville that the paper company would eventually erect a skyscraper office building on the property, which meanwhile is being used as a parking lot.

Manchester Erects Office Building

A $100,000 office building on Ninth Street Road will be built by the Manchester Board and Paper Co., Richmond, Va., according to its president, F. G. Brown.

C. E. Nuckols, the contractor, said the office, replacing present offices at 111 Hull St., will be completed next February.

J. Henley Walker, of Richmond, is the architect.

NEWS OF CONVERTERS OF PAPER AND PAPERBOARD

RIEGEL MEN LEARN ABOUT PRINTERS' REQUIREMENTS—Carnegie Institute of Technology's School of Printing Management recently held a one-week course for members of Riegel Paper Corp.'s sales and production departments. The students are shown learning the operation of a photographic type setter. . . . Riegel sponsored the Carnegie course for the second year in succession to help their salesmen learn more about printers' requirements for paper and tympans.

N.Y.U. Announces Packaging Course

The Society of Industrial Packaging and Materials Handling Engineers' 1955 "Short Course" will be held September 19-21 under the joint sponsorship of the Society and New York University at NYU's College of Engineering, 191st Street and University Avenue, New York. Plans for the Course have been developed over a period of 6 months by a committee headed by Dean Wilbur McKee of the University and Allyn C. Beardsell of Container Laboratories, Inc.

Subjects to be covered will provide engineers with an intensive review of the basic technical principles used in packaging and materials handling, a survey of modern application of these principles, a summary of recent developments in the field and reports of research projects now underway to provide continued progress and constant improvement. The Course will also include a one-day session of special interest to management, pointing out the relation of packaging and materials handling engineers to other departments within an industrial organization. In addition, there will be a 1-day conference on consumer packaging and its importance to modern merchandising.

Registration for the Short Course, or for any portion of it, may be made through the national headquarters of the Society of Industrial Packaging and Materials Handling Engineers, 111 West Jackson Blvd., Chicago 4. SIPMHE is recommending that enrollment be made early, since space is limited. Registration for the full session is $30 for SIPMHE members, $40 for non-members. Fee for a 1-day session is $12.50 for members, $15 for non-members. And special registration for a half day is available at $7 (members) and $8 (non-members).

The Society's Industrial Packaging and Materials Handling Exposition, the only national trade show devoted entirely to protective packaging and materials handling, will open at noon on September 20. To allow those who attend all sessions of the Short Course an opportunity to visit the Kingsbridge Armory Show, the Exposition is being held over one extra day, through Thursday, September 22. High point of the Exposition will be the announcement, on September 21, of the results of SIPMHE's 1955 National Championship, an annual competition for outstanding developments in the fields of protective packaging and materials handling.

St. Regis Panelyte Division to Expand

The Panelyte division of St. Regis Paper Co. has announced a half-million-dollar expansion program to increase production of injection molded and vacuum formed plastics.

Under the program, Panelyte's output of injection molded plastics will be boosted by approximately 40 percent. Production of vacuum formed plastics will be "substantially" increased.

The expansion is designed to meet a growing demand for Panelyte Division's plastics in the refrigeration, air conditioning, home appliance and automotive industries. Injection molded plastics have uses ranging from fan and air conditioning parts to television tube masks.

New Corrugated Peach Flat

A new corrugated fresh peach flat, Fibr-Crate, is being produced for packing and shipping the 1955 crop by Fibreboard Products Inc., San Francisco, after extensive tests last season.

One of the outstanding features of this new package is that Fibr-Crate can be sold intact as a half-size L.A. lug consumer unit or may be separated into two quarter-size L.A. lug consumer units.

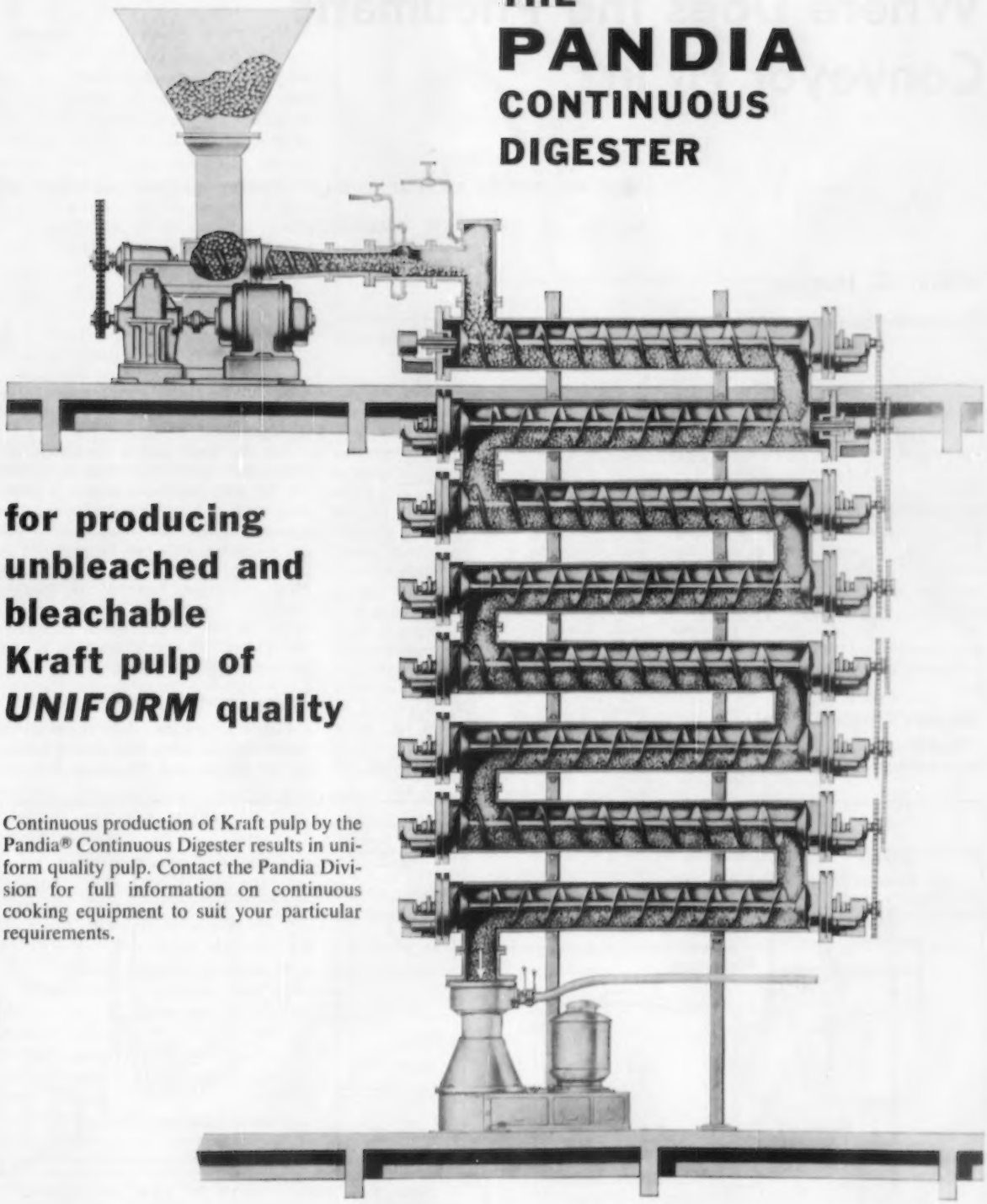
Fibr-Crate provides a substantial shipping container as well as better protection for individual peaches. Breakage and recooperage are nil, and stacking ledges insure stability and efficiency in bulk handling. At the same time, this attractively designed and printed package provides excellent retail display for the fruit.

Fibr-Crate dimensions are 16¼ x 13½ x 3¼. The stock is 200# test D.F. corrugated made with special moisture-resistant paperboard and combined with waterproof adhesives.

Samples are now available from all Fibreboard Products Inc. sales representatives in both stock and special print designs.

(Continued on page 38)

THE PANDIA CONTINUOUS DIGESTER



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Where Does the Pneumatic Conveyor Fit in?

Another article in our comprehensive series covering all aspects of materials handling.

Wilbur G. Hudson

Consulting Engineer

The pneumatic conveyor is the maverick in the conveyor family. It has had no interest for the manufacturers of mechanical conveyors because the parts involved — blower, motor, piping, separator — provide a minimum of work for their shops. Possibly another factor is that pneumatic conveying is much further from an exact science than mechanical handling. It does have the handicap of a far higher power requirement per ton per hour handled, but often it fits in nicely in problems that a mechanical conveyor cannot touch, and power usually is a minor consideration.

Unloading Pulverized Materials

Typical is the unloading of pulverized material from box cars. The favored device for moderate capacities, say up to 25 or 30 tons per hour, is the semi-automatic power shovel. A wire rope leads to a scoop from a power-operated drum which also winds or unwinds a light counterweighted chain. The drum pulls the scoop with its load to the car door where it spills into an elevator boot alongside, then the counterweight throws out a jaw clutch which releases the drum and permits the operator to pull back the empty scoop for a new load. Then the rope is given a little slack and immediately the counterweight re-engages the clutch and the cycle is repeated. For a free-flowing material weighing from 50 to 100 lb. per cu. ft. the shovel, powered by a 5 hp. motor will unload at about 20 tons per hour not including time lost in removing the door bulkhead and cleaning up. (Capacity depends largely on the skill of the operator.)

For the same job, a pneumatic unloader will require four times the power, but the door bulkheads remain in place. Any man of ordinary intelligence can manipulate the hose and nozzle, and the conveying duct can be extended to deliver the material to storage bins. Most important, however, is dustless operation due to the vacuum cleaner action at the nozzle, which eliminates the hazard to health inherent in the inhalation of most dusts.

Typical Pneumatic System

Figure 1 outlines a typical pneumatic system for unloading from cars to reserve or live storage and rehandling from re-

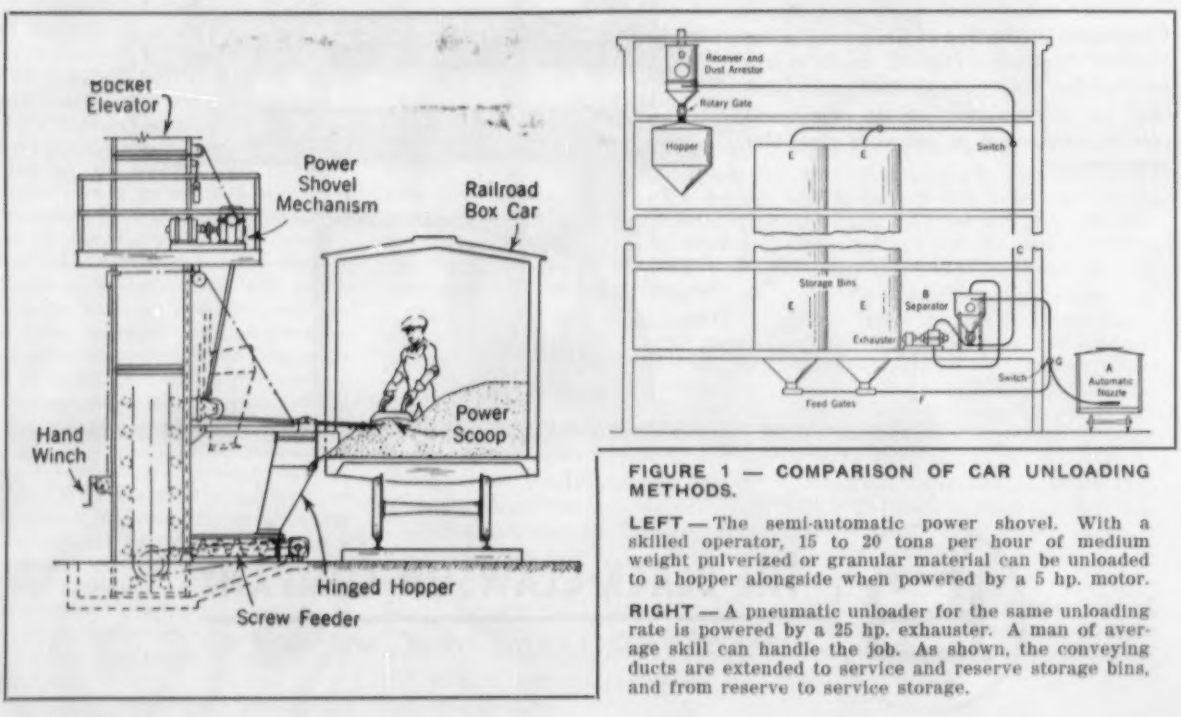

FIGURE 1 — COMPARISON OF CAR UNLOADING METHODS.

LEFT — The semi-automatic power shovel. With a skilled operator, 15 to 20 tons per hour of medium weight pulverized or granular material can be unloaded to a hopper alongside when powered by a 5 hp. motor.

RIGHT — A pneumatic unloader for the same unloading rate is powered by a 25 hp. exhauster. A man of average skill can handle the job. As shown, the conveying ducts are extended to service and reserve storage bins, and from reserve to service storage.

serve to live storage. The material is drawn into the nozzle, *A*, and into the separator, *B*. It passes down through the airlock gate and into the pressure line, *C*, which discharges either into the service storage, *D*, or the reserve storage, *E, E*, depending on the setting of the duct switch. When material is to be moved from reserve to service storage the switch, *G*, brings the suction line, *F*, into action and the movement continues as before. If the material is subject to arching, suitable bin-discharge devices are necessary — air jets, rotary table feeders, live bottoms, etc. (See "Use of Continuous Flow Chip Conveyors," *Paper Trade* JOURNAL, page 18, May 30, 1955.)

Figure 2 shows a simple application of the pneumatic conveyor which substantially reduced handling costs at an investment far less than for a feeder, elevator and overhead distributing conveyor.

At a New York paper mill sulphite lap is received in box cars. The lap was manually piled 4 or 5 feet high in the storage room adjacent to the beaters and as required was broken up with picks and shovels and moved to the beaters. Now the shredder passes the sulphite down through an air-lock gate into the conveying duct from which it is sprayed into storage. Storage capacity is greatly increased, cars are unloaded in half the time and the material is stored in better condition for the beaters. The cost of this installation is about 40 percent lower than for a mechanical system.

The blower-exhauster is usually the constant volume-variable pressure type (positive blower) which automatically maintains the variations of pressure necessary to hold the volume constant. The air volume and velocity are the factors that determine the handling capacity of the air stream. There may be circumstances calling for a variable volume-constant pressure as provided by a centrifugal exhauster. *Figure 3* is an example. Here it was required to remove from the material, metallic fragments — either magnetic or non-magnetic. The material on a slow speed belt conveyor passes beneath an adjustable air intake in which the up-draft is maintained sufficient to lift the material but not the heavier metal fragments which pass on and discharge to the floor. The positive type exhauster is unsuitable here since a fixed up-draft is essential.

Where a source of high pressure air is available a simple venturi injector nozzle may be used to produce the air stream in the conveying duct. *Figure 4* is an example. Here pulverized slate is received in bags which are emptied into a duct fitted with the venturi nozzle. Air at 75 lb. per sq. in. was available from the plant operations. The air-blast conveys the material to the storage tank from which the exhaust air drifts out through a cloth filter. When the slate is needed for the charge in the mixer at the right, a second venturi blows it to the centrifugal separator from which it passes down through an air lock gate. The exhaust air flows back to the upper part of the tank and through the filter. The filter cloths are automatically shaken free at the end of each run. Arching of the pulverized slate in the storage tank is broken by the injection of air just above the air lock.

While the pneumatic system works in nicely for the pulverized slate it is unsuitable for handling the slate granules used for facing roofing paper. At the Bird & Son plant near Boston, a pneumatic system was specified for unloading the granules from cars at 40 tons per hour and moving them horizontally and vertically a distance of about 200 feet. The capacity was readily obtained but after the granules moved through the duct and around two bends at a velocity of about 5,000 f.p.m. the material was no longer granular, and was completely unsuitable.

The pneumatic conveyor fits in where:

- Dustless operation is important;
- The path or route is torturous or difficult for a mechanical conveyor;
- Handling capacity is not so high that the power consumption becomes serious;

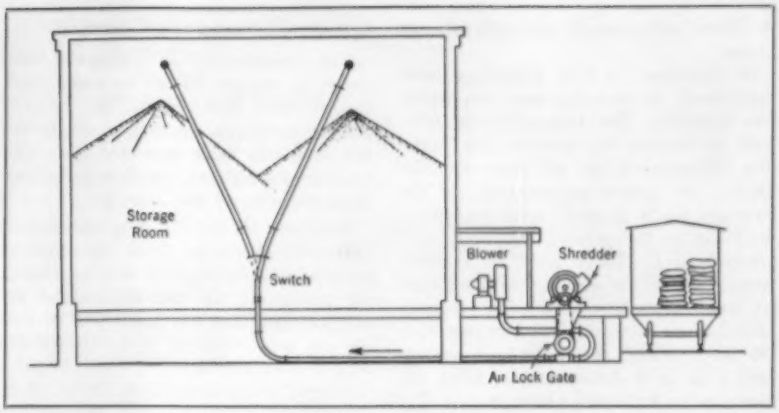

FIGURE 2 — SIMPLE PNEUMATIC CONVEYOR for stacking shredded sulphite.

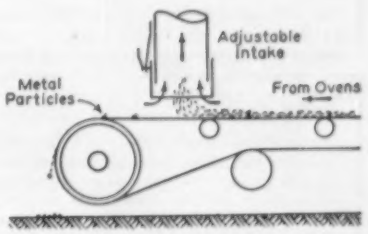

FIGURE 3—SEPARATION OF METAL PIECES, magnetic or non-magnetic, by lifting action of low pressure air stream.

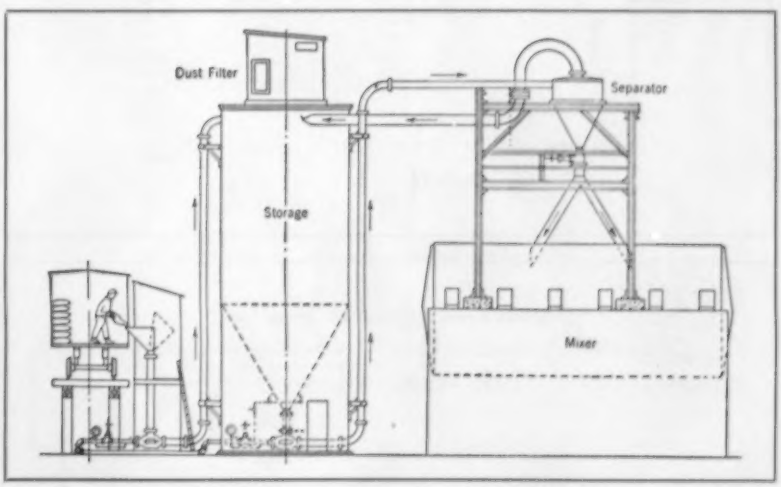

FIGURE 4 — INJECTOR ACTION of plant air at 75 lb. pressure, provides the air stream for handling pulverized slate to storage and from storage to mixer.

• Where other special requirements enter.

It functions to best advantage with pulverized or granular materials which are flowable. The larger the particles and the heavier the material, the lower the efficiency of the air blast and the higher the power requirement. If the material tends to pack, there may be a build-up at the elbows, resulting in a choked duct. There may be requirements where the continuous flow type of conveyor is best. Several wood chip installations were discussed in the May 30 issue where the pneumatic system would be at a disadvantage. After all, there is no universal conveyor.

Engineering Pneumatic Conveyor

The engineering of pneumatic conveyors is not too difficult to understand, though the vital factor, the *specific weight*, calls for experience. It is the weight in the solid increased by a factor that depends on the flowability and characteristics of the material.

Tables I, II, and *III* show the formulas used. Following these, the applications of the data given are explained. Of interest is the fact determined experimentally, that the cubic feet of free air per min. required, (Q), = Specific weight × T.p.h., or

$$Q = W \times T$$

Formulas used in the engineering of pneumatic conveyors.
(These are empirical formulas derived from operating tests)

TABLE I

Air velocity

The **velocity** of the air stream depends on the average size and weight of the individual particles (Small particles will boost along the larger). For a horizontal movement the air velocity may be lower than in a run with bends and risers. "W" is the specific weight, "V" is velocity in feet per second.

	Line Velocity*	Hose Velocity*
Straight horizontal runs. Pulv. matls.	$10\sqrt{W}$	$16\sqrt{W}$
Matls. gritty and uneven size	$15\sqrt{W}$	$24\sqrt{W}$
Runs with ells and risers. Pulv. matls.	$12\frac{1}{2}\sqrt{W}$	$20\sqrt{W}$
Matls. gritty and uneven size	$18.75\sqrt{W}$	$30\sqrt{W}$

* Plus or minus 6 per cent

TABLE II

Air pressure losses in pipes in Ounces per Square Inch, for V = 100 ft. per second and length = 100 feet. (Unwin). The last column shows the cu. ft. of air per minute which passes through the pipe when the velocity is 100 ft. per second. Friction losses in the pipe bends are for convenience resolved into equivalent lengths of straight pipe. Add six times the diameter of the pipe for each 90° bend; thus for three 90° bends in an 8-in. pipe we add 12 ft. of straight pipe.

Dia.,d.	Pressure loss Oz.	Vol. of air (Q) in Cu. Ft. per Min.
4	8.50	520
5	6.25	820
6	4.80	1170
7	3.95	1600
8	3.25	2090
9	2.77	2650
10	2.43	3270

For other velocities (V) and lengths, L, pressure loss, $P_o =$

$$P_o = P\left(\frac{V}{100}\right)^2 \times \frac{L}{100}$$

TABLE III

Orifice Losses in Ounces per Square Inch.

There is a loss in velocity-pressure at the orifice of the nozzle. Velocity-pressure for 100% orifice efficiency $= \frac{V^2}{10{,}000} \times 1.32$. For other efficiencies —

		Factor
Intake	63%	5.00
"	60%	5.50
"	57%	6.00
"	50%	8.00

Horsepower

The horsepower to handle Q cu. ft. of free air per minute at P pounds per sq. in. is

$$HP = \frac{Q \times P \times 144}{33{,}000} \text{ or } \frac{Q \times P \times 4.35}{1000} \text{ or } \frac{Q \times P}{230} \text{ (Approx.)}$$

If we assume the mechanical efficiency as 87½%, the

$$\text{Initial HP} = \frac{Q \times P \times 4.35}{0.875 \times 1000} \text{ or } \frac{Q \times P}{200} \text{ (Approx.)}$$

We must increase Q to allow for air slip in the exhauster or blower, which varies as P^2. Take the average slip as 14 per cent, or a "pneumatic efficiency" of 87.5 percent, —

In the pressure system, Motor HP = $Q \times P/175$

In the suction system, Motor HP = $\frac{Q \times P}{175} \times \frac{14.7 + P}{14.7}$

For convenience in calculating pneumatic systems we may transpose the formula above to read for P, the total pressure required in the system,

$$P = \frac{HP \times 200}{Q} \text{ in pounds per sq. in.}$$

$$\text{or } P = \frac{HP \times 3200}{Q} \text{ in ounces per sq. in.}$$

This last is a convenient form for calculating pneumatic systems. We will show the step-by-step procedure in calculating a pneumatic system and will follow with the application of these steps, taking two different layouts as applied to handling wood chips.

Procedure for calculating large-volume, low-pressure pneumatic systems.

1—Determine the quantity of air required per pound of material.

Q = W.T. cu. ft. air per min. for conveying T tons per hour.

2—Determine from the tables the velocity of the air, taking into consideration the layout of the line (whether straight or with bends).

3—Select the pipe diameter which with Q feet of air per minute will provide the velocity just determined.

4—Adjust the air volume and air velocity to suit a standard pipe size.

5—Determine the air pressure losses, which are

(a) Pressure loss at orifice in ounces per sq. in. —

$$\left(\frac{V^2}{10{,}000}\right) \times 5$$

(b) Pressure loss in hose —

$$\left(\frac{V_1}{100}\right)^2 \times \frac{35 \times P}{100}$$

in oz. per sq. in.

V_1 is the velocity in the hose, and 35 is the average hose length.

c) Pressure loss in line

$$\left(\frac{V}{100}\right)^2 \times \frac{L}{100} \times \text{coef. } (\textit{Table III})$$

d) Pressure loss in tank or receiver: 4 oz. per tank, average.

e) Pressure loss in air line between exhauster and separator or between separator and dust collector, 3 oz. average.

The *total air pressure losses* thus are — a + b + c + d + e in oz. per sq. in. (A)

Material Pressure Losses

We assume that the velocity of the material is 80 percent of the velocity of the air stream in which it floats and that this velocity is attained from rest in 1 second by the pick-up velocity of the air in the nozzle and hose,

V_1 = speed in nozzle = 1.60 V

Speed of material at end of hose = $\frac{V_1}{2} = 0.80$ V.

Then

(f) Pressure loss due to inertia =

$$\frac{M.V_1^2}{2 \times 550} = \frac{T.V^2}{100{,}000} \text{ in HP}$$

(g) Pressure loss in hose assumed as ½ of (f) =

$$\frac{T.V^2}{200{,}000} \text{ in HP}$$

(h) Pressure loss in conveyor line =

$$\frac{T}{1000}\left(H + \frac{L}{5}\right) \text{ in HP (H is lift)}$$

(k) Pressure loss at each 90° elbow =

$$\frac{T.V^2}{200{,}000} \text{ in HP}$$

(m) Total initial horsepower (m) required for material = f + g + h + k. Convert initial hp. into pressure = (m) x 3200/Q oz. per sq. in (M)

(n) Total pressure loss is A + M in oz. per sq. in., or the summation of losses in the line starting at the orifice pressure and ending with the tank.

Convert (n) into pounds, total pressure is —

$$\frac{A + M}{16} \text{ lb. per sq. in. (P)}$$

For pressure system, $HP = \frac{Q \times P}{175}$

For suction system —

$$HP = \frac{Q \times P}{175} \times \left(\frac{14.7 + P}{14.7}\right)$$

From these two the size of blower and motor are determined.

Application to a Proposed System

We now apply the above procedure to the layouts shown in *Figure 5* to handle wood chips at 20 tons per hour. In the first the chips enter the duct through an air lock feeder and are blown to a receiver coupled to a dust collector. In the second the chips are taken from a box car through nozzle and hose and drawn to the receiver—suction system.

The weight of dry chips is 25 lb. per cu. ft. Their flow is somewhat sluggish and we will take the specific weight as 50 lb.

The velocity (V), *Table I* is $18.75\sqrt{50} = 132$ ft. per second. Thus— Q = 50 x 20 = 1000 cu. ft. min.

But referring to *Table II*, we find that with a 5 in. pipe and a velocity of 132 ft. per sec., the air volume must be 1100 cu. ft. per min. and this figure is adopted. Adjusted Q = 1100. V = 132.

Proceeding with the solution of *Problem 5B* —

Air Pressure Losses

(a)	$\left(\frac{132}{100}\right)^2 \times 5$	9 oz.
(b)		0
(c)	$\left(\frac{132}{100}\right)^2 \times \frac{212}{100} \times 6.25$	25
(d)	4 x 2	8
(e)		3
a + b + c + d + e		45 oz (A)

Material Pressure Losses

(f)	$20 \times \frac{132^2}{100{,}000}$	3.5 hp.
(g)		0
(h)	$\frac{20}{1000}\left(50 + \frac{212}{5}\right)$	1.8
(k)	$\frac{20 \times 132^2}{200{,}000} \times 2$	3.5
(m)	total	8.8 hp.

$$\frac{8.8 \times 3200}{1100} = 25.6 \text{ oz. (M)}$$

$$P = \frac{45 + 25.6}{16} = 4.4 \text{ lb.}$$

$$\text{Motor HP.} = \frac{1100 \times 4.4}{175} = 28 \text{ HP.}$$

It might be stated here that this problem 5-B is one for which there is no general advantage in the pneumatic conveyor. A 16 in. belt conveyor would do the job equally well with a 7½ hp. motor. However the investment is much larger. An inclined continuous flow conveyor would do the job with a 10 hp. motor. Its maintenance would be larger.

Note that more power is expended in moving the air than in moving the material, which is why the pneumatic conveyor is high in power per ton per hour handled.

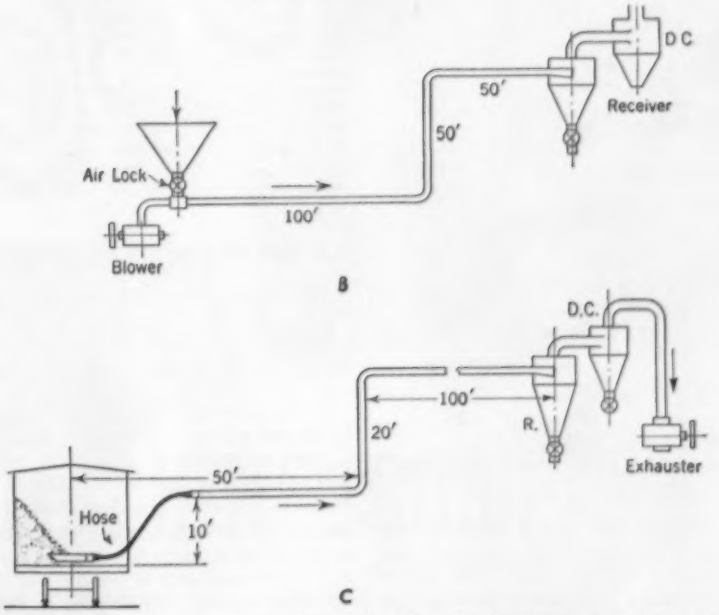

FIGURE 5 — B—Pressure system for wood chips. C—Suction system. These two layouts are used for the mathematical analysis of the pneumatic conveyor.

Problem 5—C is a typical pneumatic conveyor problem. Again—

$Q = 110$ cu. ft. per min.
$V = 132$ ft per second
$V_{hose} = 200$ ft. per sec. (4 in. hose)

Air pressure losses

(a) Pressure loss at orifice—

$$\left(\frac{200}{100}\right)^2 \times 5 \quad \ldots\ldots\ldots\ldots \quad 20 \text{ oz.}$$

(b) Pressure loss in hose—

$$\left(\frac{200}{100}\right)^2 \times \frac{35}{100} \times 8.5 \quad \ldots\ldots\ldots \quad 12$$

(c) Pressure loss in line—

$$\left(\frac{132}{100}\right)^2 \times \frac{190}{100} \times 6.25 \quad \ldots\ldots\ldots \quad 20$$

(d) Receiver 4

Total air pressure loss (A) 56 oz.

Material pressure losses

It is assumed that the velocity of the material is 80 percent of the velocity of the air stream in which it floats and that this velocity is attained from rest in one second by the pickup velocity of the air in the nozzle and hose —

V_1 = Speed in nozzle = 1.60 V
Speed of material at end of hose = $V_1/2 = 0.80$ V

(f) Pressure loss due to inertia—

$$\frac{20 \times 132^2}{100{,}000} = 3.4 \text{ hp.}$$

(g) Pressure loss in hose, assumed as $\frac{1}{2}$ f = 1.7

(h) Pressure loss in line—

$$\frac{20}{1000}\left(30 + \frac{190}{5}\right) = 1.4$$

(k) Pressure loss in three elbows—

$$3 \times \frac{T.V^2_m}{200{,}000} = 3.0$$

Total material pressure loss 9.5

Convert hp into pressure —

$$\frac{9.5 \times 3200}{1100} = 28 \text{ oz (M)}$$

Total pressure loss, A + M in oz. or

$$\frac{A + M}{16} \text{ in lb. sq. in} = 5.3$$

$$\text{Blower HP} = \frac{Q \times P}{175} \times \left(\frac{14.7 + P}{14.7}\right)$$

$$= \frac{1100 \times 5.3}{175} \times \left(\frac{14.7 + 5.3}{175}\right) = 45 \text{ hp.}$$

The designer will need a sample of the chips. Quite possibly the fragments will be too large to feed into a 4-in. nozzle and it will be necessary to go to a 5 in. nozzle and hose with a 6 in. pipe line. Then the capacity can be stepped up to 30 t.p.h. with, of course, an increased power requirement.

"Capacity" means working in the bulk material. Toward the end of a run the clean-up is at a greatly reduced rate. In other words a "capacity of 30 t.p.h." does not mean that a car will be cleared at that rate.

Limitations

The pneumatic conveyor is restricted to flowable materials. A material which "aerates", such as cement, fly ash, salt cake, soda ash, sulphur, etc. handle readily. Some of the clays likewise, but others are sluggish and pack at the bends. A preliminary test is essential. Because of the high velocity of the air stream the pneumatic conveyor is unsuitable for a highly abrasive material like sand, or for a fragile granular material where degradation is objectionable, as with carbon black pellets. (See comment on slate granules). Boiler house small coal may be handled if the surface moisture is not above 8 or 10 per cent. Quenched ashes cannot be handled but the pneumatic conveyor is widely used for dry ashes, usually with the air stream induced by steam jets at the far end of the run, which serve also to quench incandescent clinkers and lay the dust.

FIVE 25-YEAR EMPLOYEES of the Carpenter Paper Co., Grand Rapids, Mich., sponsored a surprise dinner party to welcome into their group a sixth member, LeVant Mulnix, Sr., president and general manager of the firm. Pictured standing are Claude Kuizenga, secretary, and Carl TerHaar, warehouse superintendent; seated are P. W. (Doc.) Ellinger, sales, Blanche Crosby, cashier, Mr. Mulnix, and Herbert O. Goethel, vice-president and sales manager. In honor of his quarter century of leadership all 29 employees of the paper merchant organization presented Mr. Mulnix with a Magnavox Hi-Fi Radio-Phonograph. . . . Lee Mulnix purchased the Carpenter Paper Co. from E. R. (Ned) Carpenter July 1, 1930. Since that time employment has increased from 8 to 29 — over half of whom have been with the company ten or more years. Sales have increased eight-fold in the 25-year period. Specializing in fine printing papers only, the firm sells to all of Michigan outside the Detroit and Flint trading areas. Shipments from the Warehouse at 7 Ionia Ave., S.W. and Mill Sales now average over one million pounds every month.

Abitibi Wil Sell Oak-Grain Hardboard in U. S.

Abitibi Sales Co. Ltd. reports from Toronto that it is widening its line of hardboard products by the introduction of another woodgrain hardboard—light oak.

Distribution of the new oak grain hardboard will be from coast to coast in Canada and in the northeast and north central section of the United States. The *Financial Times* of Montreal states that one of the features of the introduction of Abitibi hardboards has been the success of the company in penetrating the American market, overcoming a tariff and yet remaining competitive with domestic manufacturers below the border.

Abitibi oak grain hardboard will be marketed in panels four feet wide, and from four feet to 16 feet long.

Hammermill Acquires Robeson Process

Hammermill Paper Co., Erie, Pa., has acquired ownership of Robeson Process Co., New York. Hammermill said it has had a "substantial" ownership in the chemicals firm for many years. A majority interest had been held by West Virginia Pulp & Paper Co., New York.

Robeson will be operated as a separate organization.

"HOLYOKE"
EMBOSSING ROLLS

HOLYOKE MACHINE COMPANY

EMBOSSING ROLLS for the PAPER and TEXTILE INDUSTRIES
WATER FILTRATION EQUIPMENT
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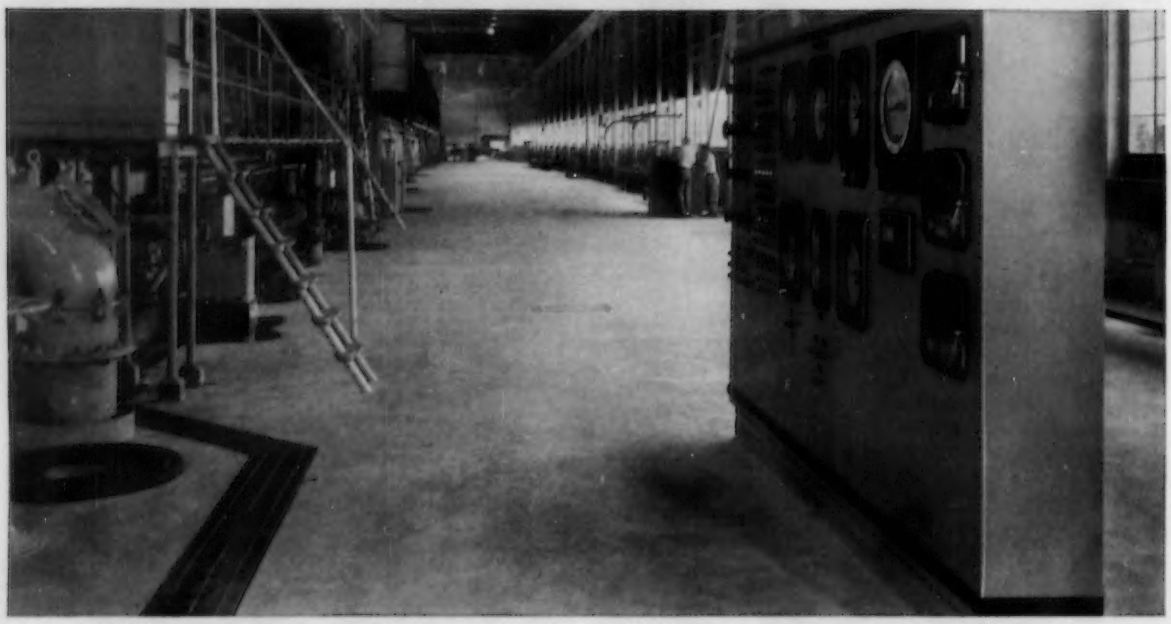
EAST TEXAS PULP AND ON INSTRUMENTATION



Machine Tenders Panel—another example of engineered instrumentation for most efficient operation.

Digester Control Panels—Complete with operating records for each cook enables the operators to reproduce a uniform product.

PAPER COMPANY RELIES BY TAYLOR

New mill at Evadale, Texas geared for maximum production

THIS NEW 300 ton mill produces some of the finest sulphate pulp in the United States—both long fibered quality from pine and short fibered from gum—as well as top grade paperboard at competitive prices. It's also a fine example of the fullest possible use of the most modern paper mill equipment to insure maximum production.

Automatic control systems are used of course on all phases of the processing, and the pictures on these pages convey some idea of the extent to which Taylor instrumentation is employed on such applications as:

cooking
bleaching
chlorine dioxide manufacture
screening
refining
recausticizing
evaporation
recovery

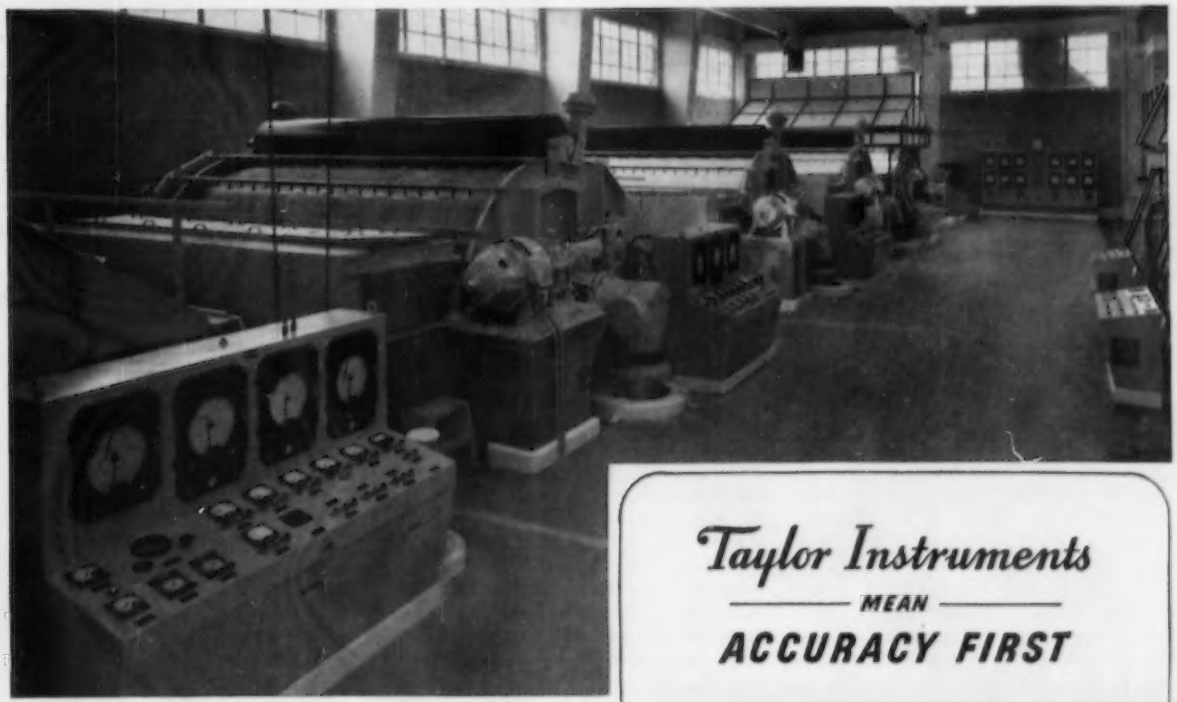
A visit to this fine new mill will show the kind of workmanship Taylor puts into its panel board assemblies for the entire control of the many variables in the processing of pulp and paper.

We're proud to have been a part of this new development, and extend our best wishes to the management and operating personnel of East Texas Pulp and Paper Company, and to the consulting engineer, H. A. Simons, Ltd.

Why not let Taylor provide you with the same kind of satisfactory operation paper mills are experiencing when they specify "instrumentation by Taylor". Call your Taylor Field Engineer, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Canada.

• • •

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.



Bleach Plant Automation—where finger-tip control is emphasized together with convenience for operating personnel. Bleach plant central panel at end of aisle.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

How A Study of Basic Principles Led to the Development of the Hi-Lo Pulper

Dwight E. Jones

E. D. Jones & Sons Co.

The development of the Hi-Lo Pulper results from a study of basic principles and extensive laboratory work. Here is a review of a few fundamental facts.

Pulping may be described broadly, as mechanical action which puts pulp or various forms of paper broke into a slurry. It is well-known that the rapidity of developing a slurry is roughly in the ratio of the intensity of the mechanical action. However, it is one thing to create a pulp slurry but it is quite something else to perfectly separate all the fibers in the slurry. A slurry consisting of fiber bundles is often easy to produce, but the machine which does it may not be capable of separating the multiplicity of bundles into freely suspended fibers in a reasonable time.

A good example of this is a breaker beater. This type of machine has an intense action, and for lots of kinds of pulps and broke, it will do quite an acceptable job; the feeding problem not considered. Feed such a machine, however, with old newspapers or Kamyr pressed and fully-dried kraft pulp using 70 degree F. water, and complete defibering becomes nearly impossible. Hand sheets made after 8 to 10 hours beating show that much more action is needed for fiber separation. Even at that, fiber separation is assisted by the gradual rise in temperature. (Temperature is an important consideration in this problem of pulping and defibering and will be discussed in some detail.) We have seen the development of Kamyr-pressed and dried pulp which has been reduced to a slurry in a Hollander beater, as distinguished from a breaker beater. A half-hour after charging, the roll was lowered to provide a gentle beating action, gradually as the cycle progressed, more pressure was applied. Nevertheless, at the end of five hours, the beater stock had many fiber bundles. In the meantime, much of the pulp had been beaten. After three passes of this pulp through jordans, there was an occasional fiber bundle. Such pulping action as this can seriously devalue the potential of the raw material.

FIGURE 1 — Typical breaker beater at roll and backfall.

As a matter of interest in the whole problem of pulping, let us examine the action which takes place. *Figure 1* shows a typical cross section of a breaker beater roll with a perforated backfall. It is customary to place the bars spaced from 3 inches to 12 inches apart and clear of the backfall from 2 inches to 5 inches. It is obvious that such a device will *paddle* the slurry to give it vigorous circulation. Once material is reduced to flake form, there is little action of a type which can cause further separation. Time and temperature will help, but the action of separation into fibers progresses slowly. *Figure 2* shows a similar cross section for a beater with a bedplate. (It is assumed that in both of these machines that most of the action takes place between the roll and backfall area. To be sure some splashing occurs outside this area, but the resulting work is minor.) In the case of the beater, it is usual to space the roll bars not over 3 inches apart and to put 12 or more knives in the bed plate. Further the clearance between, the roll and plate can be varied at will. If the roll is brought down so that fiber bundles are trapped between roll bars and bed plate knives, they will be either cut or torn apart. It is well-known that if the roll is brought down hard after initial slushing, the fibers will be broken or cut and the physical values of the pulp seriously injured. On the other hand, if plenty of time is taken and a gentle pressure applied, defibering can be affected. Then and only then is the fiber ready for mechanical treatment. The difficulty is getting the proper gentle mechanical action to cause defibering in advance of beating.

It has already been mentioned that some Kamyr-pressed kraft pulps are not cleared in 5 hours of beating. There is ample proof that many pulps should have from 12 to 24 hours "brushing" action to give them a proper "wetting" and defibering in present types of equipment. There are paper makers who are well-aware of the problems of defibering and use the utmost care in reducing both broke and pulp, and in some cases, they may take as long as 12 to 15 hours to completely defiber the materials. They have determined that with the type of equipment used, a shorter period will

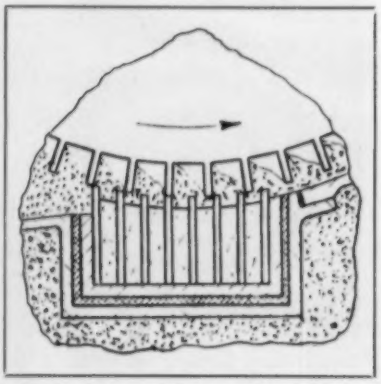


FIGURE 2—Section through Hollander beater.

degrade the potential physical values of their raw material. Not all paper makers are aware of this loss and even if they were, they do not have the facilities for a prolonged pulping and defibering operation.

This consideration of what happens to various types of furnishes is extremely important and the degradation mentioned with beating equipment is today far more prevalent with the use of pulpers which do not defiber and which make it necessary to apply auxiliary equipment such as refiners, following the pulpers. These defibering machines behave in the same manner as a beater in that it is possible to adjust the clearance between the revolving and the stationary members. If the clearance is reduced to provide a gentle brushing action, defibering can take place smoothly without serious loss of potential values. However, the setting of a refiner is always a matter of judgment, and usually, the mills are deficient in refining equipment for such clearing operation and it is not unusual to find refiners set-up so that breaking and cutting are part of the so-called defibering operation. In the treatment of waste papers, this attempt to clear with the refiners is even more prevalent. Most waste papers have fibers which are perfectly usable without further preparation. They need only to be separated and if the mills using this material could find a way to quickly get these materials back close to the state which they were in before forming into a sheet of paper, they would have a raw material of high potential value.

Now, let us direct our attention to the mechanical construction and action which takes place in a pulper. Fundamentally, all pulpers have certain things in common:

1—That they have one or more revolving elements which tend to create turbulence or circulation.

2—They have an open tank so that it is possible to charge in raw materials either in bale or in loose form without danger of jamming.

In the development of a pulper these basic elements and several others must be recognized and organized in their proper relationship.

Circulation or Agitation

The need for agitation or turbulence is fundamental. If work is to be done on pulp, it must pass over and over again the element or elements causing the turbulence. Each time pulp passes in its general path of circulation over the device causing the mass to move, it is hit. It is easy to picture what takes place, especially in the early stages of pulping. Bales, part bales and bundles moving with the mass are hit by a rapidly moving impeller and are reduced in size. Very little happens while the pulp is moving in the tank. Regardless of the density or the intensity of the circulation, there is comparatively small amount of rubbing to cause pulp bundles to be separated. Even as the pulp slurry leaves the tip of the revolving impeller, its velocity is reduced within a few inches to the general movement of the mass. The only important change which takes place to an increment of pulp from the time it leaves and returns to the impeller is absorption of water.

As pulp leaves the impeller (we assume that it has been subdivided) new edges are exposed to water. This absorption of water helps to soften the pulp so that on the next trip over the rotor, further dividing takes place. It is obvious that all the pulp must pass over the element causing circulation frequently. A pulper with poor circulation is generally unsatisfactory for anything except the very softest materials.

Rotor or Impeller Design

Almost any type of revolving element in an open vessel produces a characteristic motion to the surrounding fluid. Such a revolving element tends to throw off the liquid at its outer diameter or rim and to pick up a replenishing supply at or near its axis, where the velocity is lowest. Not only is there this tendency to throw off at the rim, but there is also a tendency to cause the surrounding mass to rotate. The whole effect is to create a vortical flow. This is not always apparent because of submergence or interference, or because the action simply is not strong enough to be observed.

Note sketches, *Figures 3, 4,* and *5.* Here, we have shown three different basic designs of rotors. In all cases, the circulation is outward and there is a return of the pulp to feed the rotor at its point of least activity. It matters not the position in which the rotors are mounted in an open tank; that is, they may be horizontal, vertical, or at some intermediate angle. That principle of circulation remains the same. The position of mounting may have some advantage for a given design of machine; for example, mounting a drive or for obtaining complete submergence. The fundamental point to remember here is that generally speaking, the flow pattern of the stock remains the same as long as

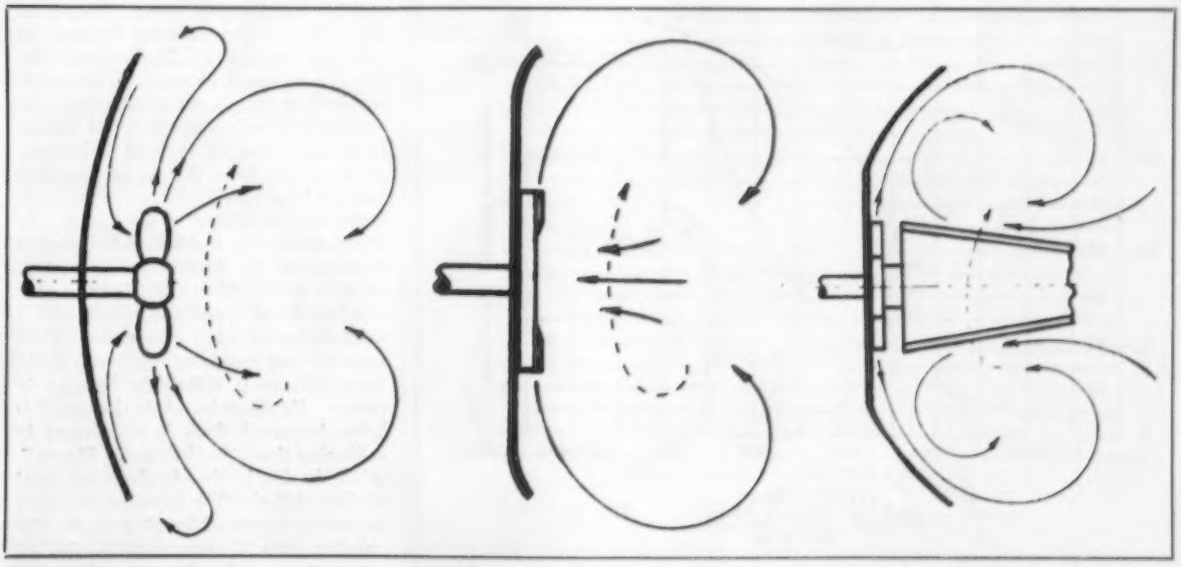


FIGURE 3—Propeller in open tank.

FIGURE 4—Disc with vanes in open tank.

FIGURE 5—Truncated cone in open tank.

the units are totally submerged and kept totally submerged, regardless of the degree of turbulence. Further consideration will be given to the more exact design of the rotor and its impellers.

Consider that we have just one design of rotor available for our use. Which one are we going to select? Solely from the point of pulping and defibering, the most effective will be a single disc which can be rotated in exactly the middle of a tank. (See *Figure 6.*) In this case, the one revolving disc in the center of the tank creates turbulence on both of its sides, assuming the vane arrangement is the same on both sides.

In this hypothetical design, we use a large diameter of disc with respect to tank capacity. There are two characteristic paths of circulation each with a minimum length of travel to bring an increment of pulp back to the active zone. Because the disc can be large in diameter there can be a large number of vanes and retain space so that each vane is effective. Further, each vane can be small since each vane needs to pump only a small amount of pulp to maintain circulation. The small size of vanes in turn permits high peripheral speeds without consuming an unreasonable amount of power. It can be demonstrated theoretically and in full scale that this double-faced disc rotor is highly effective and perhaps the most efficient arrangement which can be provided with one

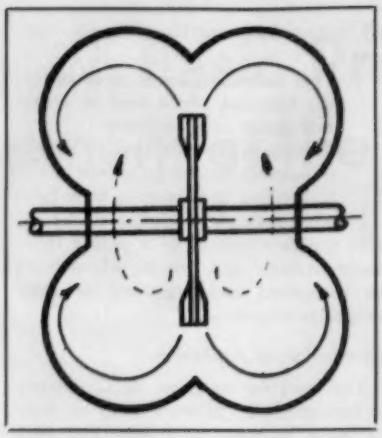


FIGURE 6

revolving element. To summarize—this theoretical design makes possible:

a) Short path for pulp circulation.
b) Frequent defibering action.
c) Small vane size, to produce circulation.
d) High peripheral speed.

It is unfortunate that this design which has such a good combination of desirable features has also undesirable features. The most obvious drawback is the mounting of the rotor mid-way in the tank. This mounting, at least partially, trespasses on the basic premise that a pulper tank must be open for the free entrance of the charge of pulp. There is danger with some types of broke of wrapping the shaft. It is obvious, too, that there are two identical flow patterns set up for each side of the rotor. Mixing from one side to the other is nearly impossible.

It is obvious that we must mount the rotor flush or nearly flush with tank wall or bottom to prevent wrapping of the shaft. It is also evident that when we resort to a single flush mounted rotor that to provide for complete circulation, we must have greater "push" assuming the tank capacity remains the same. There are two ways of getting this additional "push." The easiest way is to increase the impeller or vane size. It is apparent that doubling the vane size (assuming that the arrangement makes possible unrestricted flow *to* and *through* the vanes) will double the quantity discharged. This brings us back to the same point as our hypothetical pulper, with a two-sided disc rotor. The equivalent of both sets of vanes is placed on one face. However, we will find that even this change is not enough. Because of the longer path for circulation and the tendency to become sluggish at the farthest removed areas, it may be necessary to at least triple the vane size. Note that while the vane size has been increased, the number of edges has been cut in half. Vane or impeller edges have a very important function in causing defibering; this is subject for additional discussion. For the present, we conclude that flush mounting of the disc increases the power for circulation while reducing the defibering action.

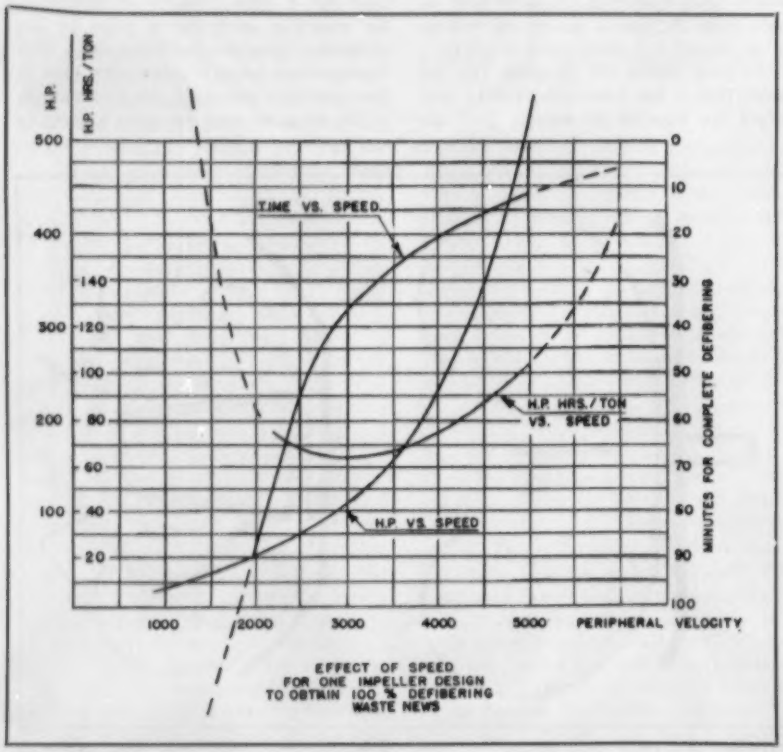


FIGURE 7

Effect of Speed

The second possibility with a flush-mounted rotor to maintain adequate circulation is to increase speed. This is an extremely complex influence because results are not changed in direction relationship to speed changes. The power required to turn a rotor with vanes increases very rapidly as the speed climbs. In the lower ranges, the rate of increase of power may be as the one and one-half power of the speed. Soon this increase varies as the square of the speed. As higher levels are reached, this variation increases as the third power and so on up the scale. *Figure 7* illustrates the relationship of speed and power with a fixed design of rotor with vanes. Compare surface speeds of 3,000 and 5,000 f.p.m. There is a five-fold increase in power. Fortunately, while the speed is being increased there is a decrease in defibering time. In the case of Figure 7, this reduction in time is about one-third of the original. The horse-power hours per ton is increased by 67 percent. Circulation, also, changes rapidly with increase in speed. In examining this chart, it is evident with peripheral speeds

below 3,000 f.p.m., that there is also some adverse trends. The power drops off as speed is decreased, but the time for complete defibering goes up very rapidly.

At the lower speeds initial break-up of the pulp or broke proceeds rapidly, providing that there is good circulation. However, obtaining fiber separation is something else. It is evident that we must have speed (or mechanical attrition as discussed earlier). Our Chart *Figure 7* shows a favorable trend for defibering for speeds up to 5,000 f.p.m. It appears logical that this favorable trend would continue for even higher speeds, and this has been confirmed by laboratory work. It is evident, however, that the size, shape and angle of the vanes or impellers must be altered in order to diminish power. As we deal with pulps or broke which are highly resistant to defibering, it becomes evident that we confront an almost impossible problem to provide the solution by designing a single rotor.

In a single rotor unit, it is always necessary to design so as to obtain a reasonable compromise. There must be reasonable total connected power, circulation must be satisfactory, initial break up done promptly. The rotor speed must be as high as possible to cause defibering. If the speed is too great, the power will be unreasonable unless the vanes or impellers are reduced. When this is done, then the circulation may be reduced. It is, thus, an endless race trying to combine desirable features in one rotor. The natural conclusion is to employ two or more rotors in a given tank. Then it is possible to employ the full advantages of speed. One rotor with large vanes running at a slow speed to provide the major job of circulation and rough breaking, or creating the slurry. The second rotor with very low vanes to run at very high speed.

It can be shown that rotors such as this run in combination provide optimum pulping and defibering results.

Action of Impellers

It is not enough to know that there exists power, circulation, defibering relationship with changes in rotor speed—we must know why. At the start of a pulping cycle it is easy to picture what happens. A bale of pulp moves with the water into the path of the rapid turning rotor. A blade on the rotor strikes a corner of the bale and rips it off. Even though the bale of pulp moves with the water and is a free body, its inertia holds it almost rigid in front of the rapid moving rotor blade. The action produces a slurry of water and pulp flakes. *Figures 8a and 8b* help to explain what happens after the initial

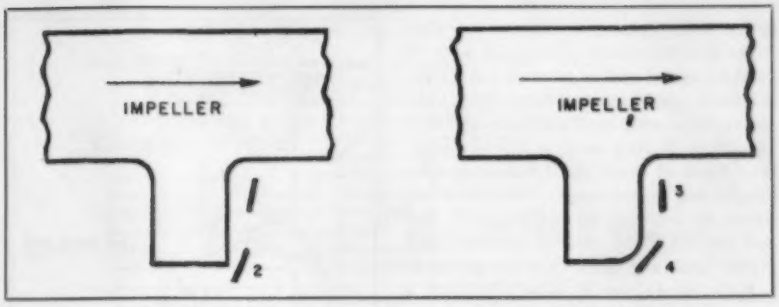


FIGURE 8a FIGURE 8b

Pulp flakes about to be hit.

stages of pulping. Both views show a small section of rotor with single impeller moving in a slurry of large pulp Flakes 1, 2, 3 and 4. Up to the very instant of being hit, these flakes move with the slurry at a rate of only a few feet per minute. Compared to the impeller, these flakes are practically static. They, too, have inertia, and are backed by the slurry. It is easy to imagine Flake 2 being ripped apart where it squarely straddles the sharp leading edge. It is less easy to picture Flake 4 being changed in size. Certainly Flakes 1 and 3 are likely to slide off unharmed. However, as speed is increased these flakes which are caught on a rounded or flat impeller surface are dealt a harder blow. For a brief instant, as they slide off the impeller they are rubbed extremely hard. Where flakes will escape reduction at 2,000 f.p.m. they will be reduced at 3,500 f.p.m.

As the speed is increased, the "blows" become increasingly harder. It is reasonable to conclude that the "force of the blow" follows well-known laws of mechanics and varies as the square of the velocity. Hence, the impact on a given increment of pulp or fiber bundle will be 3 times as great at 3,500 feet as at 2,000 f.p.m. impeller velocity. At 5,000 f.p.m. the impact is six times as great. If the velocity is still further increased to 10,000 f.p.m., the blow is increased 25 times.

Hitting a hard blow helps to open and separate fiber bundles. However, the characteristics of the striking surface is of utmost importance. Refer again to *Figures 8a and 8b.* It is obvious that pulp Flake 2 stands a better chance of being torn apart than any of the others. This looks logical and it has been confirmed by many mill observations and checked in the laboratory. A square leading edge is far more effective than one that has become or has been made rounded. Furthermore, an edge will defiber where a flat surface will merely circulate.

Design of High-Speed Disc

We have observed that impeller speed

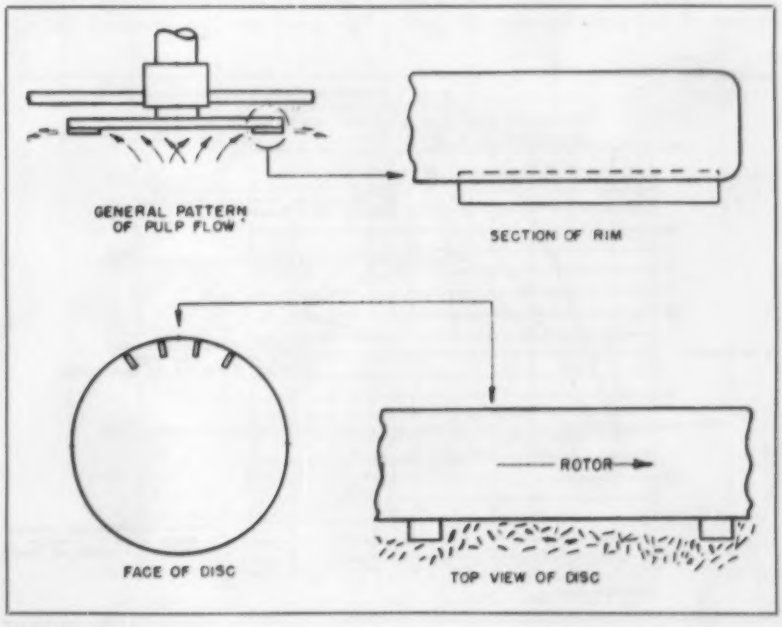


FIGURE 9

is extremely important and we know that edges are important. The problem is to combine speed and edges in a way to get the most rapid action. Consider a pulp slurry filled with hard undefibered flakes ⅛ inch to ½ inch more or less in diameter. Each of these small flakes must be caught and pulled apart. Not only must flakes of this size be pulled apart, but still smaller flakes must be reduced until every "knit and knot" has disappeared.

Refer to *Figure 9*. This illustrates a rotor and fragments of a rotor at the rim. Picture this moving at 6,000 feet per minute or 100 feet per second. This is like any other rotor with impellers, except that the impellers are *small*. Obviously, this rotor will create circulation, in fact, it will throw off pulp at a tremendous rate considering that the impellers *are small*. Because of the size of the impellers and because the rest of the rotor is generally quite smooth, very high speeds are possible without consuming an excessive amount of power. In fact, speeds are possible of 8,000 or 9,000 feet per minute, or even more.

The small vanes or impellers are only at the rim because here we have maximum velocity. If attempts are made to cover a greater portion of the disc face, there is always a compromise in the impact velocity brought to bear on the pulp slurry. Also, there is the possibility of putting the slurry into motion, if there is more than one set of impellers, so that much of it escapes those impellers near the rim where the velocity is greatest. Consider again *Figure 9*. It is evident that the flat smooth surface of the disc is going to have little effect on the surrounding pulp. True, some of it will tend to adhere to the surface and be thrown off and a small amount of circulation will be created. However, the impellers, small as they are, tend, at the high velocity with which they are moving, to "cut a hole" in the mass of pulp. This strong tendency for the impellers to exhaust themselves of pulp forces a rapid replenishing supply hard up to the disc in the immediate area of the impellers. Flakes, bundles of all sizes are forced into the active zone and they can not escape the action.

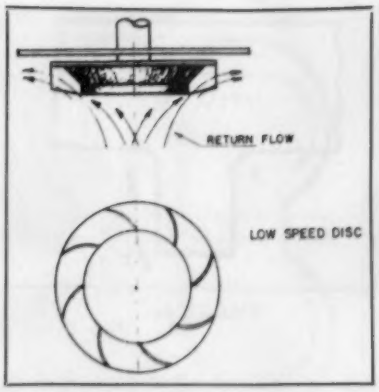


FIGURE 10

It has taken a laboratory program to carefully determine the proper projection for the impellers, the best length to diameter ratio, angle with reference to radial line and maximum speed. The amount of projection of the impellers above the disc face is extremely important. An increase projection of 1/16 inch can alter the whole action. It will, of course, increase the amount of power or make it necessary to reduce the speed. Also, diminish the projection by 1/16 inch and there may not be enough impeller to catch fiber bundles properly. The speed may be increased but not enough to give good action. Spacing of impellers is just as critical as the amount of projection. No real harm can come from a wide separation of impellers, except getting too few. However, getting them too close together can be very harmful. This is apparent, see *Figure 9*, because of the flow of pulp. It takes an appreciable space to get a constantly changing supply to the leading edge of an impeller. If the impellers are too close, they are shielded and only part of each is able to do any work.

These small impellers must have a sharp or at least a square edge. Ordinary materials will round over a few hours, even stainless-steel will dull at these high speeds in a few days. There is a certain amount of corrosive action in any pulping operation. There is a lot of polishing effect and this effect increases with the speed. Combine the two actions and raise the temperature and the problem of keeping a square impeller edge becomes very real. We have resorted to the use of one of the cemented carbide materials. This resembles a diamond in hardness and is very resistant to corrosion. The material resists the polishing effect of pulp and hence will stand up for long periods. The entire disc is made of stainless and is renewable, independent of the rest of the mechanism.

Low Speed Rotor Design

It is obvious that the function of this rotor primarily is to create mass turbulence. It must, therefore, pick up and deliver large quantities of pulp very much the same as a propeller. However, a propeller is not desirable because of bad characteristics on certain kinds of pulp. The most effective way of creating this mass turbulence is to use relatively large vanes spaced very far apart so that they may be fully-loaded and run at modest speeds so as not to consume an unreasonable amount of power. It is also apparent from previous discussion that this low speed rotor should be as large in diameter as it is practical to make it in relation to the tank capacity. This permits the greatest number of vanes and it also makes a minimum path for the pulp to travel from the time it leaves the rotor until its return.

It is also apparent that the center of such a rotor moves at relatively low speed and that very little action would be obtained. Because of this low speed, at this point the pulp will return and start to move towards the rim. Any attempt to put on vanes or impellers in this area can be a source of trouble if the angle in any way is directed into the flow of stock. Unbroken pulp can move across such vanes, starting a build-up which may eventually destroy the whole action.

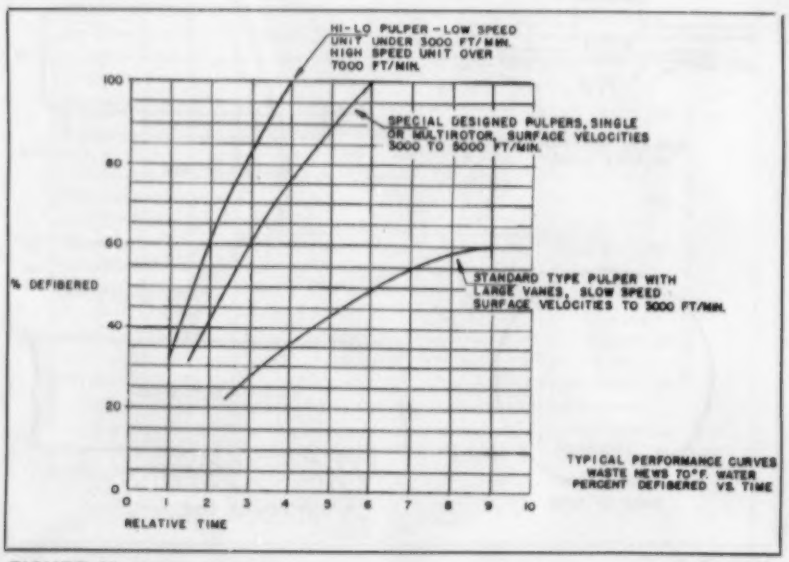

HI-LO PULPER – LOW SPEED UNIT UNDER 3000 FT/MIN. HIGH SPEED UNIT OVER 7000 FT/MIN.
SPECIAL DESIGNED PULPERS, SINGLE OR MULTIROTOR, SURFACE VELOCITIES 3000 TO 5000 FT/MIN.
STANDARD TYPE PULPER WITH LARGE VANES, SLOW SPEED SURFACE VELOCITIES TO 3000 FT/MIN.
% DEFIBERED
RELATIVE TIME
TYPICAL PERFORMANCE CURVES WASTE NEWS 70°F. WATER PERCENT DEFIBERED VS. TIME

FIGURE 11

In our long series of experiments, the conclusion has been reached that the entire center of a rotor should be left completely smooth, see *Figure 10*. Even if there is a slight tendency to build its own flow pattern, this flow pattern is constantly shifting so that there is no danger of lodgment.

The vanes or impellers on the slow speed rotor are scrolled much in the same order as a centrifugal pump as it has been found that this type of design will move the greatest amount of pulp for the least power. Also, it is important that the low-speed rotor be designed to provide good circulation for the highest consistency. Generally speaking, the horse-power hours per ton for completely defibering any pulp are in inverse ratio to the density. (Later there is a discussion of the effect of density.)

It is a mistake to assume all pulping action is left to the high-speed unit in our combination. This low-priced rotor serves much more than just a pump. It is quite as effective as ordinary pulpers and will quickly batter to pieces whole bales of broke or pulp. The whole construction is a one-piece stainless weldment with very heavy vanes.

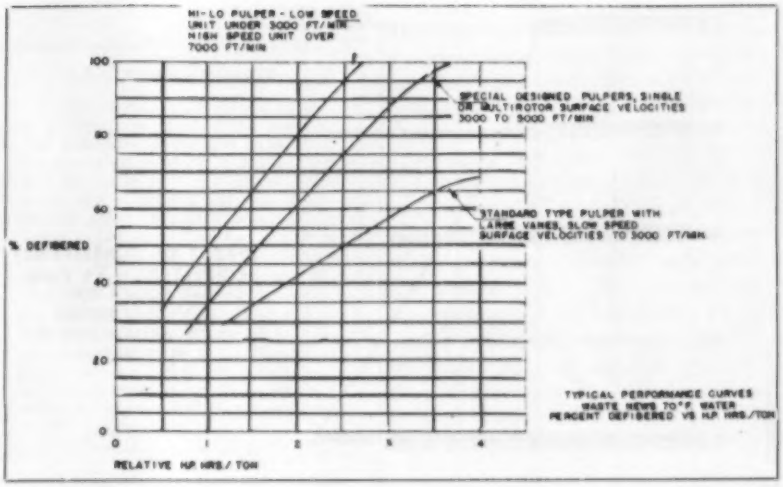

HI-LO PULPER - LOW SPEED UNIT UNDER 3000 FT/MIN HIGH SPEED UNIT OVER 7000 FT/MIN
SPECIAL DESIGNED PULPERS, SINGLE OR MULTIROTOR SURFACE VELOCITIES 3000 TO 5000 FT/MIN
STANDARD TYPE PULPER WITH LARGE VANES, SLOW SPEED SURFACE VELOCITIES TO 3000 FT/MIN.
% DEFIBERED
RELATIVE HP HRS./ TON
TYPICAL PERFORMANCE CURVES WASTE NEWS TO 70° WATER PERCENT DEFIBERED VS H.P. HRS./TON

FIGURE 12

Performance

The acid test for a sound theory is the examination of a series of tests. All of our laboratory work in the development of the Hi-Low Pulper has been done in a tank of 700 pounds capacity at 6 percent. This is larger than our smallest commercial pulper. The tank for this unit is far from ideal. However, since we were not troubled with circulation or lodgments, no attempts were made to alter the initial shape. Previous experience leads us to conclude that commercial machines will have even better characteristics than our development model.

Our tests were made with many types of raw materials, most of them resistant to defibering. Many tests have been made with wet-strength brokes, some of which have been impossible to reduce in other machines. Wherever there are comparative tests we have used overissue news in 70 degree F. water (unless otherwise noted). This material is quite resistant to complete defibering and makes an excellent source of raw material for test purposes.

Figures 11 and 12 present an interesting study. The lower curve in both cases is typical performance for our Pulp-Master, and other pulpers with relatively low-speed large vanes. The Pulp-Master is an excellent machine for creating a high consistency slurry, but this and similar machines do not provide the rapid defibering action. After 60 percent clearing further fiber separation stops almost completely. The intermedi-

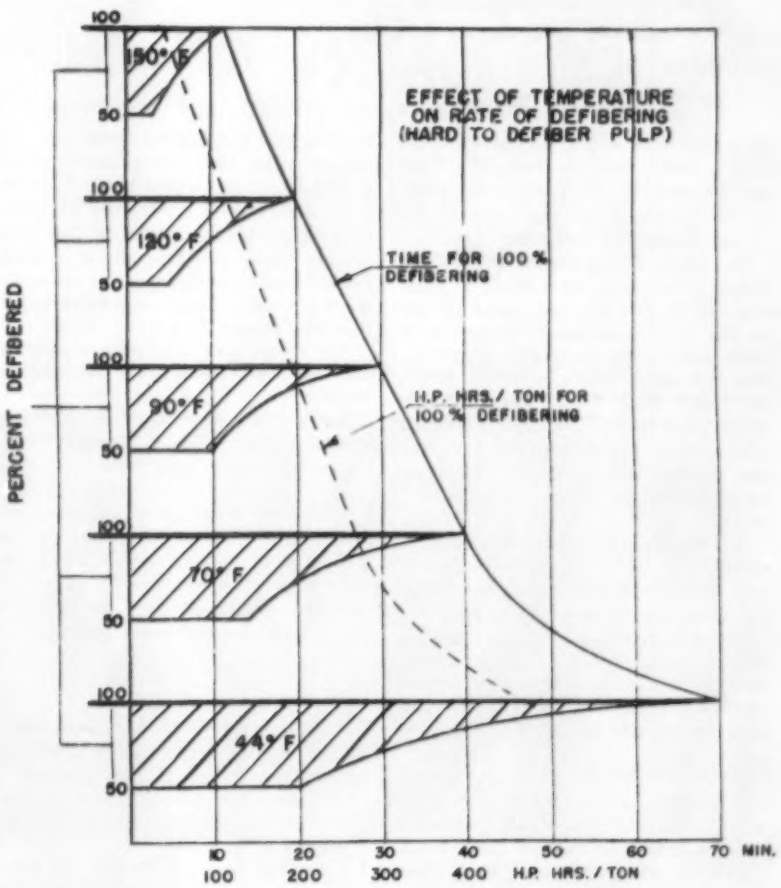

EFFECT OF TEMPERATURE ON RATE OF DEFIBERING (HARD TO DEFIBER PULP)
150° F
120° F
90° F
70° F
44° F
TIME FOR 100 % DEFIBERING
H.P. HRS./ TON FOR 100 % DEFIBERING
PERCENT DEFIBERED
100
50
10 20 30 40 50 60 70 MIN.
100 200 300 400 H.P. HRS./ TON

FIGURE 13

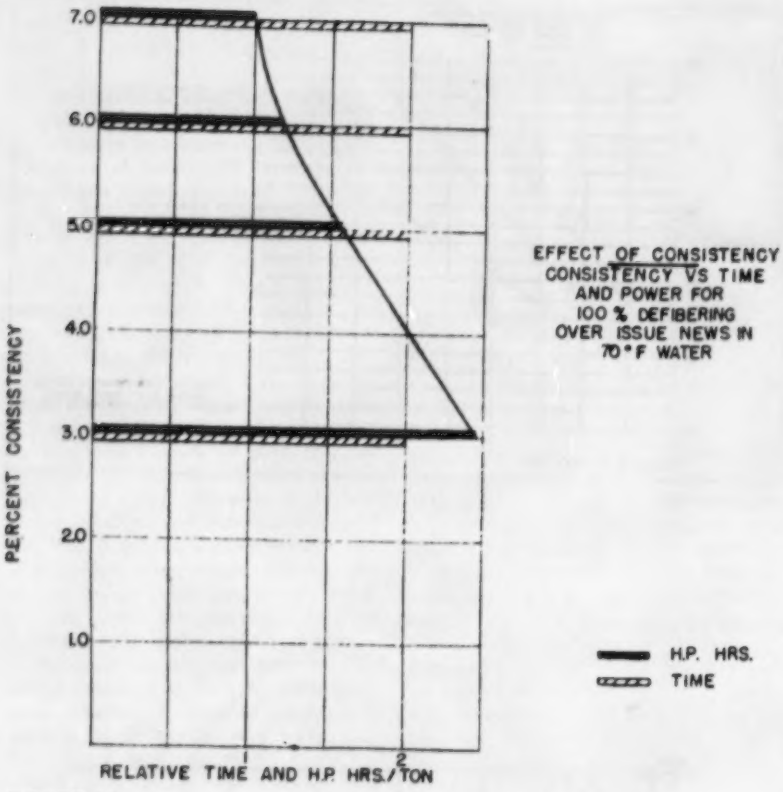


FIGURE 14

ate curves show a marked improvement. This is made possible where the rotor was designed for a significant stepping-up of the speed and there are an increased number of defibering edges.

The upper curves are for the Hi-Low Pulper. No efforts were made to show startling results by concentrating unusually large amounts of power on a small unit. (Note paragraph on power.) The low speed unit took power within the range of 50 to 60 hp; the high-speed rotor took 60 to 70 hp. In all cases results are determined from the time pulpers were furnished. No break-up period or any other allowances were made.

All tests started with 70 degree F. water. The Hi-Lo pulper shows 33 percent time-saving and a 25 percent hp/ton saving over a very efficient pulper.

This tells only part of the story. The Hi-Low Pulper will deal with wet-strength brokes *without cutting* that have previously been very difficult or impossible for mills to handle.

Effect of Temperature

It has long been the practice in board mills and others where pulps or broke resisted defibering to heat the furnish. Figure 13 shows a series of tests where the starting temperatures were planned to follow a sequence. The rapid change in time and horse-power hours per ton indicates the need for mills to study proper operating temperatures. In some cases it may point to economy by planning to provide hot water so that furnishing can quickly be made at a satisfactory temperature range. In all cases there is need of conserving white water that may already be warm.

Any comparison of pulpers or pulping must be made at an equal temperature level.

An interesting sidelight in studying effects of temperature is the power used for the high-speed rotor. Water is more fluid at higher temperatures and the power required for the high-speed rotor drops off. When it is known that a pulper is to be used constantly at or close to 200 degrees F., the high unit can be increased in speed by 10 to 15 percent with corresponding improved results.

Consistency

A series of tests were run to show: 1) the effect of consistency on ability to completely defiber; 2) time required; 3) horsepower hours per ton.

Consistencies were tried of 3, 5, 6 and 7 percent all at a fixed temperature and for identical broke. The *time* for complete clearance of the broke for this whole range of consistencies was *exactly the same*. No attempt is made to explain the reason for this phenomenon. It is important, however, to note that regardless of the consistency, that pulping proceeds to give *total clearance*. It does show that the material is drawn through the action zone of the high-speed rotor and that the impact on the small particles is sufficient to cause complete separation. However, *Figure 14* illustrates that the horse-power hours per ton is vastly different for 3 percent and 7 percent density. This figure clearly illustrates that it pays to keep the density as high as possible. This group of tests show only one kind of broke. Each pulp and broke has its own flow characteristics and it is desirable to establish an operating density that gives good circulation.

Good circulation should be the determining factor, bearing in mind that maximum consistency will produce the lowest cost pulping.

Capacity, Tank Size and Power

In our table of dimensions for the Hi-Lo Pulper, there is a listing of standard sizes, starting at 500 pounds, 1,000 pounds, 2,000 pounds, etc. It is perfectly possible to exceed the capacity listing by employing multiple units as for example, two high-speed units with one low-speed, or the other way around —two low-speed units with one high-speed or the combination of four units as they are being employed in the large Brokemasters. This flexibility beyond our normal listing can most economically be accomplished by using the mechanical parts which are packaged units in connection with tanks that are built on the job of either concrete, tile, or made with concrete and lined with tile, depending upon the particular mill's requirements.

In our standard tables, we show a range of power which may be applied both to the high and the low-speed units. This is confusing. However, some explanation may help to clear the reasons for this range of power. Take first, the case of the low-speed disc or rotor which is the main unit causing the mass turbulence. The speed at which this is run fixes the amount of power. Once this speed is fixed, the amount of power required remains fairly constant, regardless of the consistency. However, in the lower range of speed there is a fixed upper limit of consistency at which good turbulence can be had for the entire tank. Thus, if the unit is always to be used where the upper limit of density is 4 percent, there is no point in applying circulating power much above the level which is required to give good turbulence at this density. On the other hand, if there is an application where a maximum density is required, then the speed and

power should be increased to provide for this density.

Generally speaking, batch operations are calculated to work in the range of 5 to 8 percent with an average level of 6½ percent. It should again be pointed out that the time for complete defibering is almost identical regardless of the density, but that the horse-power hours per ton are lowest for maximum density. Where wet-strength broke is of prime consideration, it generally pays to plan to work in the maximum density range so that the minimum amount of chemical and hot water are required.

In the case of the high-speed disc or rotor, satisfactory operation can be obtained over a wide range of peripheral speeds. If a particular mill needs to limit power loads, a smaller size motor may be applied with some extension of the time cycle, or if it is known that all of the materials to be defibered are relatively easy to handle, and that in any event the time cycle will be short, the smallest recommended motor may be applied and complete satisfaction obtained.

On the other hand, if all of the work for the unit is hard-to-defiber wet-strength and it is known in advance that the unit is to be operated at high temperatures, it may prove to be advantageous to run at a maximum speed. Again, we point out that temperature affects the power applied by an appreciable amount and in the case of constant high temperature operation, higher speed may be obtained without an increase in the applied power.

The Hi-Lo Pulper is a very rapid defibering unit and it pays to plan to utilize its greatest potential. This can be done by making certain that the loading time for both water and pulp is a minimum and that the defibered material can be taken away in the shortest practical time.

Careful planning in this direction will make possible the installation of the smallest practical tank size and generally speaking, applying to this unit the maximum amount of power will make possible the lowest horse-power hours per ton. This, of course, means concentrating energy on a minimum quantity of pulp for a very short time cycle.

Mixing

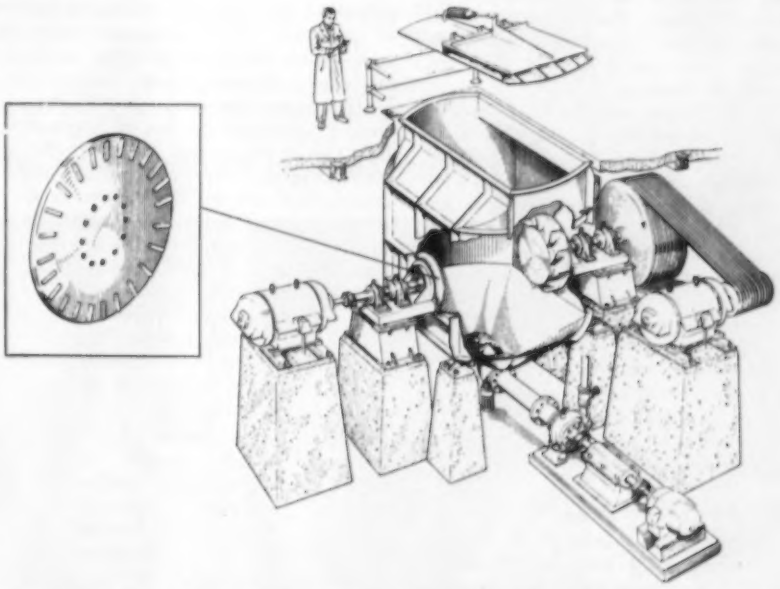
Mixing is not a problem with Hi-Lo Pulpers. It is normal to run the high and low rotors in opposite directions. This causes complete mixing even with maximum consistency.

Regardless of the direction of rotation, the difference in velocities between the high and low rotors quickly causes a blending throughout the tank. The action of the high-speed rotor, particularly, makes complete color and chemical blending possible with fibers which are completely separated. Two or three minutes in this machine is more effective than 30 minutes in a beater.

We make no claims that the Hi-Lo Pulper will develop fiber. We know that it will completely separate fibers *without cutting*. There have been several tests where we have observed a substantial improvement in tear. We do know that this machine will do a complete job of getting pulps ready for beating type of treatment. In many cases, it will produce treatment on wood pulps that is superior to a Hollander beater, and in a fraction of the time.

Acknowledgments

The Hi-Lo Pulper did not just happen as a single inspiration. It has come the slow hard way. There have been many discussions, laboratory tests, building and discarding of rotors, consideration of the art of pulping and examination of what others have done. Many people in our organization have had a part in this development work. Special recognition is given to E. H. Cumpston, Jr., Director of Research, David R. Dalzell, Jr., now Chief Draftsman, who was in the Laboratory during part of this development work, and Philip Murphy, in charge of the Laboratory. These men have made many contributions and the outcome has their enthusiastic endorsement.



Result of Pulping Studies Was This Hi-Lo Pulper

BIDWELL SPEAKS AT ALBANY FELT—Shown above are James E. Smith, assistant sales manager of Albany Felt Co.; G. Lamont Bidwell, manager of the Riegel Paper Corp., Milford, N. J., mill; Glenn Drake, guest speaker on selling; and Wayne G. Davis, Albany Felt vice-president in charge of felt sales. Mr. Bidwell addressed a recent Albany Felt semi-annual sales meeting on the subject, "A Paper Mill Manager Looks At Felt Salesmen."

APPA Speaks Out For Amendment Of the Pending Water Pollution Bill

The action taken by the American Pulp & Paper Assn. on July 20 to acquaint the House Public Works Committee of the paper industry's views on pending bill S.890, has been recorded and circulated. In a move to effect amendment of several shortcomings in this bill "to extend and strengthen the Water Pollution Control Act," APPA sponsored the appearance before the House Committee of Jesse M. Holderby, as expert witnesses.

E. W. Tinker, executive secretary of APPA, reports that although the Committee was too pressed to entertain Mr. Holderby's oral presentation, a full written statement of his argument was filed with the Committee. Mr. Tinker reported further that "the hearing ended on an inconclusive note, with substantial opposition being voiced to the features of the bill objectionable to the paper industry, and several of the Committee members indicated that no action on the bill should be taken until the next session of Congress when ample opportunity might be provided for industry to explain its objections to S. 890."

Holderby's Chief Arguments

In the APPA statement, Mr. Holderby, manager of by-products division, Rhinelander Paper Co., outlined his extensive qualifications as an expert in the field of pollution abatement which embrace about 30 years direct experience in both public and industrial capacities.

After urging the committee not to lose sight of the distinction between two types of stream pollution—domestic sewage that endangers public and industrial waste that is mainly a nuisance factor, Mr. Holderby proceeded with these specific recommendations:

"Now I come to the first respect in which we urge that S. 890 be amended. The bill as it now stands purports, 'To extend and strengthen the Water Pollution Control Act.' But, amazingly enough, a diligent search among the definitions comprising Sec. 9 discloses no definition of 'pollution' itself. Certainly the Surgeon General, who is directed to control pollution under certain circumstances, needs a specific definition by which to recognize it, and the courts need a guide in reviewing his actions. Just as certainly the water users who discharge their effluents into the streams, who have under this bill the legal obligation not to pollute, are entitled to know precisely what they may not legally do.

"We therefore recommend that there be inserted in Sec. 9, preferably just ahead of the present subsection (a), a definition of 'pollution.' We suggest as such a definition:

"The term 'pollution' means the discharge of any sewage, industrial waste, or substance which adversely affects such waters by endangering the health or welfare of other persons."

"Our second criticism of S. 890 arises from a significant deletion of language from that of the present Act. P. L. 845, 80th Congress, Sec. 2(d)(7) of the present Act provides that a court considering an application for an injunction shall give due consideration to the practicability and to the physical and economic feasibility of securing abatement of any pollution proved. Section 7(d) of S. 890, as passed by the Senate, deletes this language, presumably thereby precluding consideration of such factors by the court.

"Clearly, in considering what to do in a case of alleged pollution, the court should in all fairness consider practicability and physical and economic feasibility. Failing such consideration, the court under the present language of S. 890 might feel itself directed to uphold an order which could impose upon a municipality or an industry burdens beyond its capacity to sustain and completely out of proportion to the magnitude of the offense. Keeping in mind that significant health hazards arise almost solely from the bacterial content of domestic sewage and that most industrial waste merely deplete dissolved oxygen, it would seem unreasonable to prevent a reviewing court from consideration of practicability and feasibility in the pollution abatement orders imposed upon an alleged industrial polluter . . .

"We therefore recommend that there be inserted in Sec. 7(f) on page 20, line 19, between the words 'court' and 'shall' the following language taken directly from the present Act:

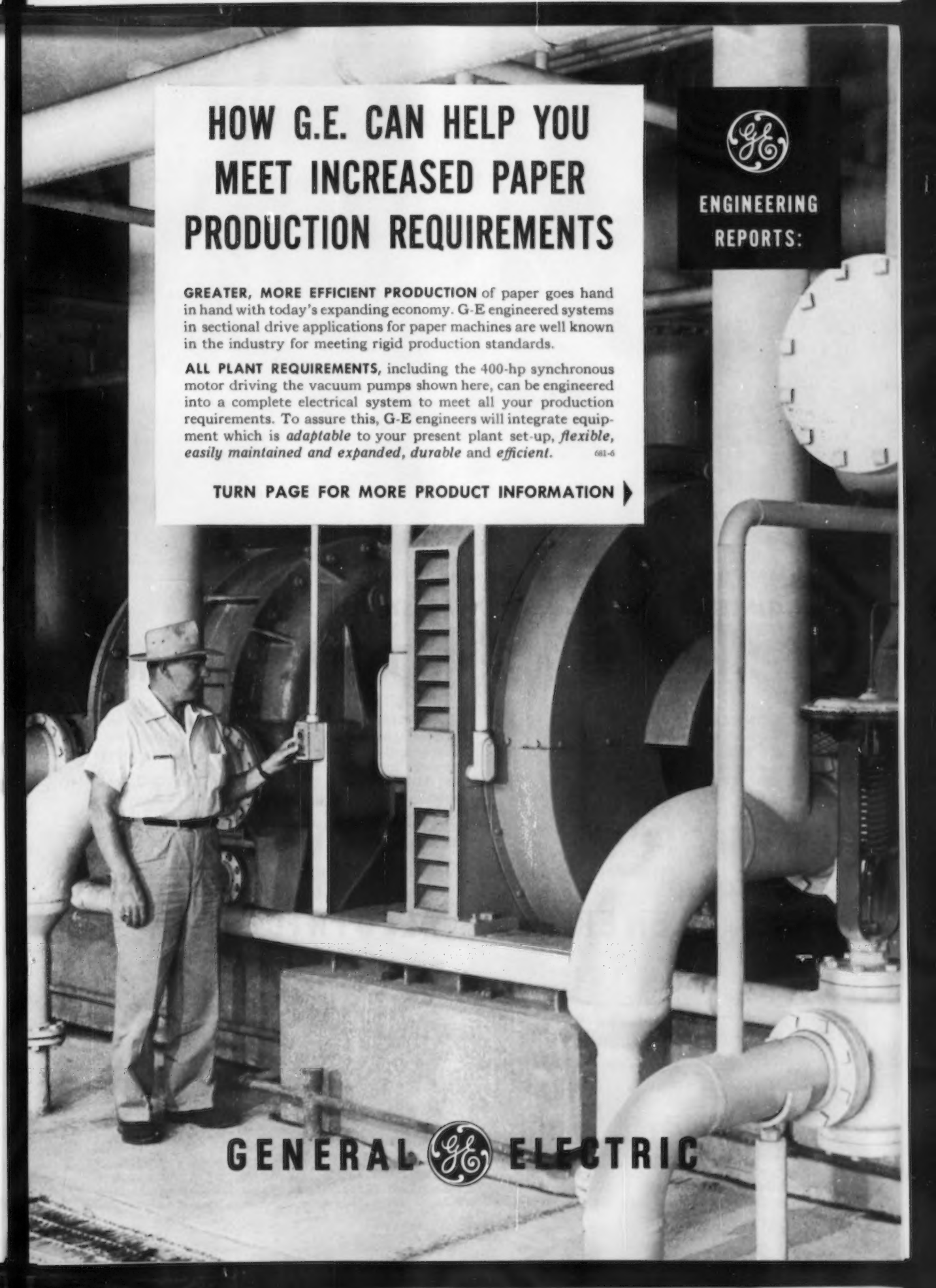
'Giving due consideration to the practicability and to the physical and economic feasibility of securing abatement of any pollution proved.'

"Our third point deals with another significant alteration of language and procedure between P. L. 845, 80th Congress and S. 890. Sec. 2(d)(4) of the present Act provides that the Surgeon General may 'request the Attorney General to bring a suit on behalf of the United States to secure abatement' of interstate pollution only 'with the consent of the water pollution agency (or any officer or agency authorized to give such consent) of the State or States in which the matter causing or contributing to the pollution is discharged.'

"S. 890, Sec. 7(d) uses substantially the same language as to consent of the State where the pollution originates, but adds, 'or at the request of the water pollution control agency (or any officer or employee authorized to make such request) of any State or States where the health or welfare of any person or persons is adversely affected by such pollution.' . . . S. 890 specifically states, by a Senate amendment, that 'nothing in this Act shall be construed as impairing or in any manner affecting any right or jurisdiction of States with respect to the waters (including boundary waters) of such States.' Every water user will echo hearty approval of this provision. However hard they may push us—and, believe me, they do!—the State people know local conditions: they know the history and attitude and policy of every municipal and industrial water user. They know where they must be tough, whom they can safely trust to act in good faith, what industry's shutdown might put an entire town on the relief rolls. We in our industry prefer to continue being bossed by folks who know us. We greatly prefer not to be turned over to a new Federal enforcement and control personnel that will of necessity for at least a good many years look in the rule book instead of using the seasoned judgment that the State personnel owns. In our opinion, if the downstream State is allowed to become the prime mover in an easily instigated Federal suit against an alleged polluter, it is only a question of time until some ambitious Surgeon General elbows the State agencies aside and takes over the whole pollution control function.

"Actually, any downstream State already has adequate legal recourse against an upstream State that will not force its polluters to behave considerately. Competent legal experts agree that

(Continued on page 38)



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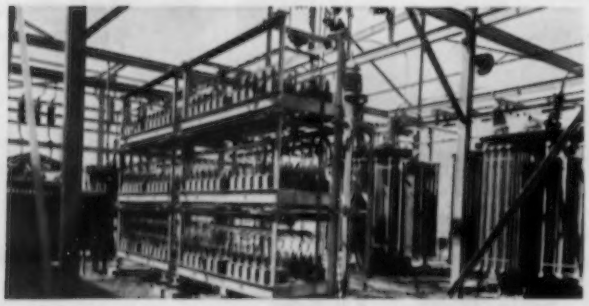

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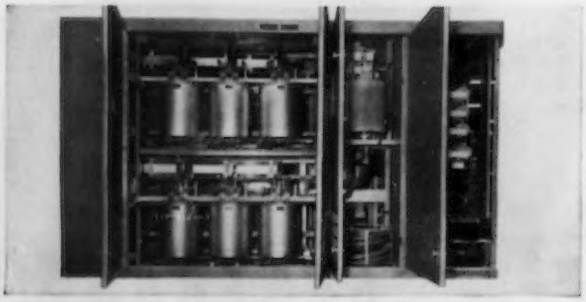

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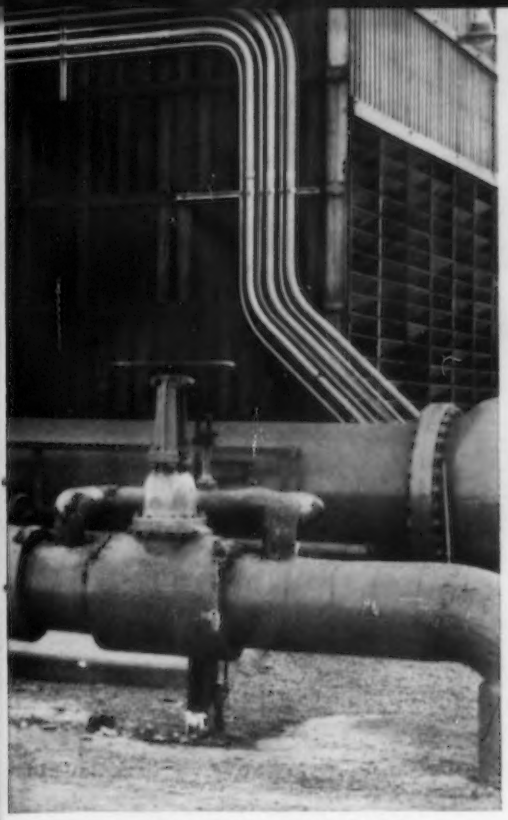

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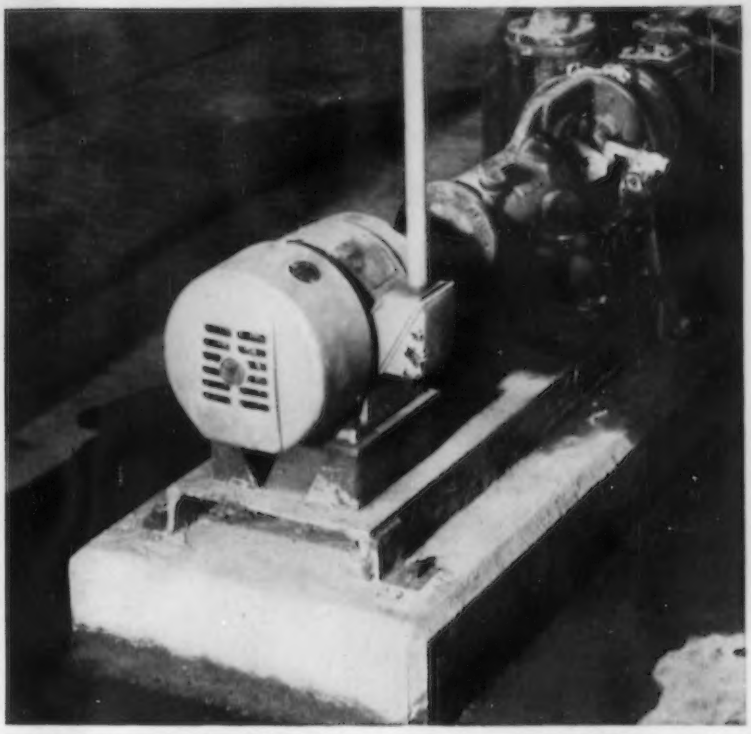

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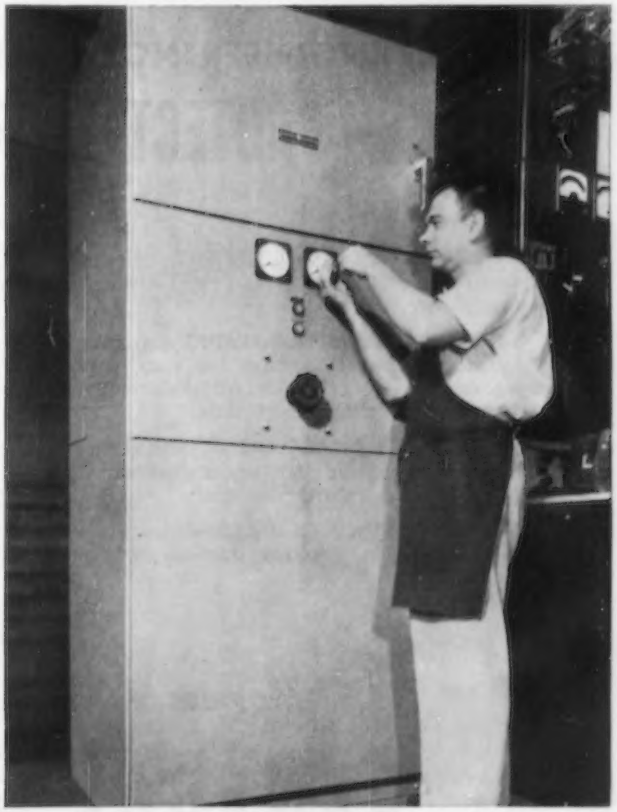

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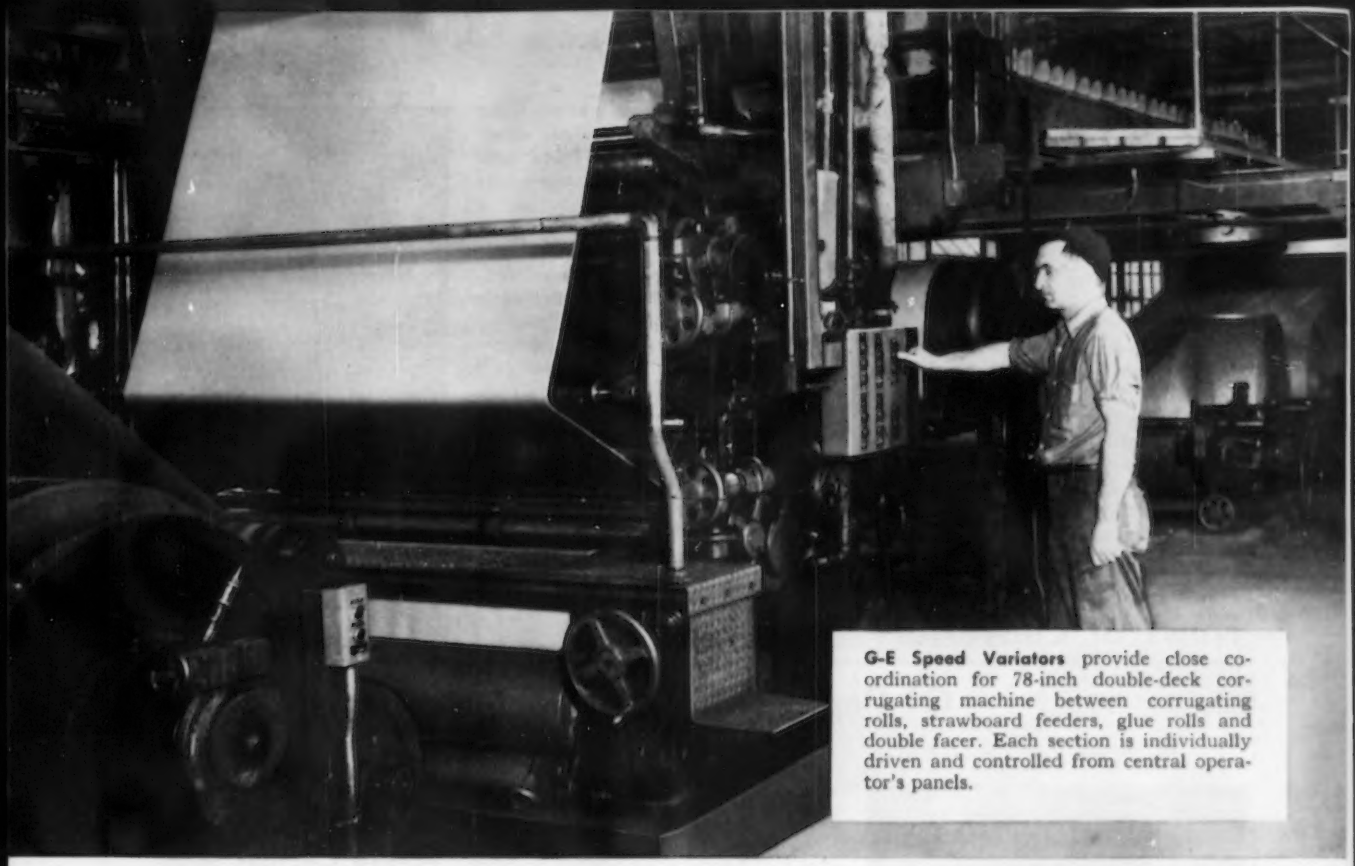

G-E Speed Variators provide close co-ordination for 78-inch double-deck corrugating machine between corrugating rolls, strawboard feeders, glue rolls and double facer. Each section is individually driven and controlled from central operator's panels.

G-E SPEED VARIATORS KEEP MACHINE SECTIONS IN STEP FOR HIGHER PAPER OUTPUT

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WIDE APPLICATION: G-E Speed Variators have been successfully applied on many machines, including super-calenders, winders, washers, wet-end helpers and line shafts. In paper mills, large and small, the G-E Speed Variator assures optimum performance, easy installation, and low maintenance.

FOR FURTHER INFORMATION: Contact your nearest G-E Apparatus Sales Office. Or write to Section 815-7, *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.*

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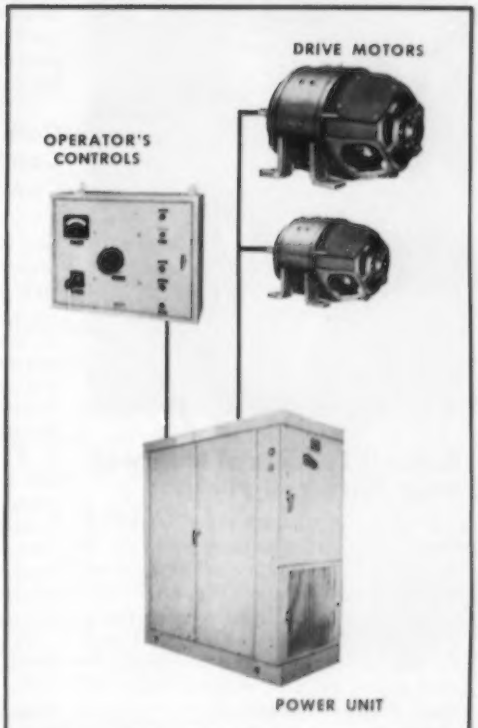


"Packaged" design means less conduit runs and easy installation. The G-E Speed Variator is a completely pre-tested drive system assuring top performance, low maintenance.

there exists legal and constitutional authority in each State of the Union to bring an original action in the Supreme Court of the United States to compel a neighboring State to abate pollution of water which causes injury to the complaining State. Such suits have been filed and litigated to successful conclusion.

"The Sanitary District of Chicago is engaged in a large scale, long-term pollution abatement program as a result of the lake diversion case brought by other Great Lakes States. The States should be encouraged to use the ample legal authority now in existence instead of being deprived of it by the consequences of this provision in the bill.

"We therefore recommend that there be deleted from Sec. 7(d) the following language: 'or at the request of the water pollution control agency (or any officer or employee authorized to give such consent) of any State or States where the health or welfare of any person or persons is adversely affected by such pollution.' . . .

"It is our view that the Federal Government should restrict its activities in the field of water pollution abatement to fundamental research and guidance, and if necessary, to financial assistance to the States, but we feel that all enforcement should be left to State authorities who can effectively carry. out their responsibilities and have made great strides in improving pollution conditions in the face of the tremendous industrial expansions that have taken place over the recent years."

News of Converters

Of Paper and Paperboard

(Continued from page 14)

Reports Success of Multiwall Bags With Foil Ply

Bags, incorporating a ply of laminated kraft paper and aluminum foil, are a recent development in the products of Hudson Pulp & Paper Corp.

The foil-paper material is being specified as one of the plies of multiwall bags for bulk packaging of hygroscopic chemicals, resins, or other products requiring high moisture protection.

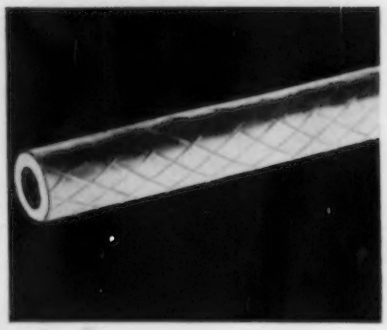
Godchaux Sugars, Inc. is using 50-pound foil lined bags for packaging its Camola animal feed, and Reynolds Metals Co., supplier of the foil for the bags, is using a 100-pound bag for packaging and shipping activated alumina, a chemical product which is highly moisture-absorbent.

Extensive tests have been conducted on the asphalt laminated foil-Kraft material in Reynolds laboratories. It has been found that the foil-Kraft layer, when used as the inner ply of a multiwall bag, affords about three times more protection against moisture gain than does a polyethylene lined multiwall bag, according to report.

Colby Fibre Products Consolidates With Lewis Container

Consolidation of Colby Fibre Products and Lewis Container Co. has been announced by E. W. Lewis, president of both companies of Colby, Wis. Colby Fibre Products had used the facilities of Lewis Container. The Board of Directors and officers of Lewis Container will remain unchanged, with Walter S. Goodspeed as Chairman and Aytch P. Woodson, D. C. Everest, J. E. Forester, E. W. Lewis, R. K. Stolz, G. B. Bonfield and F. W. Oldenburg as Directors. The officers of Lewis Container are E W. Lewis, president, R. K. Stolz, vice-president, J. E. Forester, secretary, M. E. Cooper, assistant secretary, C. C. Boyer, treasurer, and V. B. Pielage, assistant treasurer.

The administrative and sales offices of Lewis Container will move from Colby, where plant expansion is under way, to Wausau, Wis. on or about August 1. The new address is 142 West Washington St. The company's Design Department will also move to the new location. Mr. Lewis stated that construction progress for plant expansion at Colby is on schedule.



Fox Edge Offers New Paper Furniture Cord

The Fox Edge Co., Inc. of Lowell, Mass., is introducing a new welting and seaming cord which will soon be demonstrated to furniture manufacturers. Known as Foxtex Cord, it consists of a twisted tissue paper cord which is covered with bleached cellulose wadding and then braided with strong rayon or nylon yarn. It is said to be firmer and more resilient than any other braided welting cord on the market.

Research Group to Plug Waxed Cartons with Cartoon

The familiar voices of Hollywood's Billy Gilbert, radio's Bill Thompson and others are starred in the Paraffined Carton Research Council's coming movies, *"The Butcher, the Baker, the Ice Cream Maker."* The production is a full-color, sound, cartoon-style movie now being shot in Hollywood due for completion early in August, according to Harvey H. Robbins, executive secretary of the Council. Plans for distributing this 10-minute movie to ice cream manufacturers, trade groups, television stations, theaters, schools, and clubs will be announced shortly.

Billy Gilbert, the veteran rotund character actor and comedian, provides the voices for both the Baker and the Merchant in the Council's movie. Bill Thompson, the man of many voices, is the Butcher. Thompson, the "old-timer" and several other characters on Fibber McGee and Molly programs, has worked in many cartoons and radio shows.

Sponsoring the movie are the members of the Paraffined Carton Research Council: Bloomer Bros. Co., Newark, N.Y.; Burd & Fletcher Co., Kansas City, Mo.; Chicago Carton Co., Chicago, Ill.; Container Corp. of America, Chicago, Ill.; Marathon Corp., Menasha, Wis.; Michigan Carton Co., Battle Creek, Mich.; Pollock Paper Corp., Dallas, Texas; The Richardson Taylor-Globe Corp., Cincinnati, Ohio; Sutherland Paper Co., Kalamazoo, Mich.

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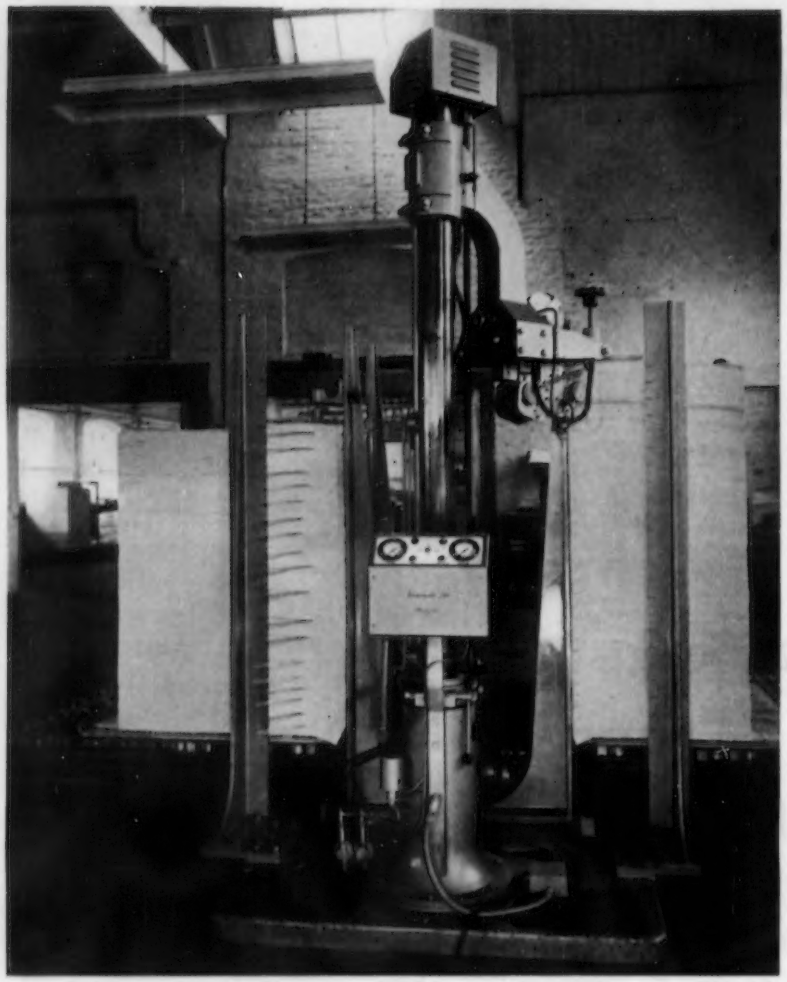
NEW EQUIPMENT

AND SUPPLIES



New Paper Counter

A machine for the counting of paper in stacks up to 4½ feet high, direct from skids, has been announced by Vacuumatic North America, Inc., 405 Lexington Ave., New York 17, N. Y. The counting unit, called Model Mark V, has a count speed of 1500 sheets per minute, and operates at 99.5 per cent of accuracy provided a good corner is presented to the rotating counting knife, company officials state.

The entire counting procedure is fully automatic. There are only two buttons on the control panel to press in order to start the counting operation. One brings the counting head to the paper, and the other starts the vacuum pump, which in turn begins the automatic cycle. When the paper has been counted, the head is lowered automatically into the starting position again and is ready for the next batch of paper.

Two loading bays are provided so that while the counting cycle is in progress, the operator may load another bay, thus maintaining continuous operation of the machine. Swinging the counting head from one bay to the other is a simple matter, the manufacturer states, and takes but a matter of seconds.

Since counting is done only at the common in hand counting operations, is corners of the sheets, sheet damage, eliminated. The machine, it is claimed, can in one day do work previously requiring 8 efficient hand counters, and with far greater accuracy.

A tape inserter is provided as a standard part of the unit, which inserts tapes after every 100, 250, or 500 sheets. The number of sheets counted before a tape is inserted may be varied to suit the specific requirements of the user.

Sheet size is not a factor in the automatic counting operation. Several models are available which are designed to handle material as small as lottery tickets, and others for the largest sheets of printing paper. The Mark V Model has been designed specifically for the paper and printing industries.

Counting is done by a fast revolving counting blade. A small hole provides suction, and draws the bottom sheet down away from the stack. A wiper pin moves back and over the sheet corner, and slips the counted sheet away from the revolving blade which is ready to pick the next sheet up with another rotation.

Operation of the unit is simple and one day adequately serves as training time for an operator. Minimum counting height of the machine is 14½ inches from the ground.

The product was sold extensively in England and continental Europe by Vacuumatic Ltd. Introduction of the counting devices to the United States is a recent move. Several units have been installed in paper mills.

The product is of rugged construction throughout, and requires little maintenance. The standard electrical requirements of the unit are 230 volts, 50 cycles single phase, A.C. An alternate supply includes 110 volts, 60 cycles, single phase, A.C.

Payloader Features Special Bucket Action and Power Shift

The third, and largest, of the new four-wheel-drive tractor-shovels to be added to the "Payloader" line has just been announced by the manufacturer, The Frank G. Hough Co., Libertyville, Ill.

Designated as model HO, this unit has a capactiy of two cubic yards and is similar in styling and outward appearance to the 1 and 1½ cubic yard models which were recently introduced.

The outstanding features of "pry-out" bucket action; 40 degrees of "breakout" at ground level and new standards of safety and stability are common to all three new models.

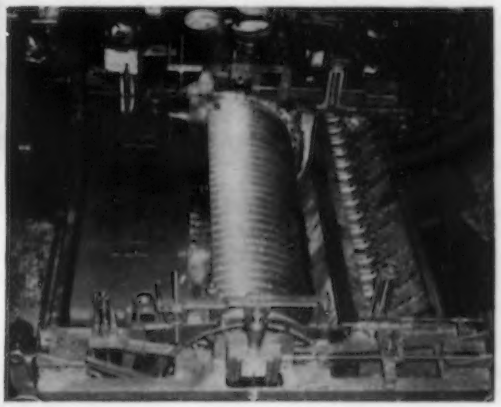
In addition, the shovel loader features

ECONOMY
High-alloy layer—10% or 20% of total plate thickness—assures corrosion and abrasion resistance, long equipment life.

DESIGN FREEDOM
Integral bond allows design and fabrication of shapes to meet process and space needs.

STRUCTURAL STABILITY
Low-cost carbon steel backing provides necessary strength and rigidity.

The center section of this cylinder mould vat was fabricated of corrosion-resistant, 10% clad steel.



CLAD STEEL EQUIPMENT PERMITS

FULL DESIGN FREEDOM

For new digesters, head boxes, beater tubs, flow boxes and other equipment, economical clad steel construction gives you maximum design freedom. Because of the integral bond between cladding and the carbon steel backing plate, there are no restrictions on shapes or contours such as linings might impose. Clad steels can be readily worked by conventional fabricating tools and methods, and can be modified with normal cutting and welding without endangering the surface or bond. For pressure vessel design, full gage consideration is permissible under the ASME Code.

By using clad steels, you get all the advantages of solid, high-alloy construction—protection from corrosion, abrasion and product contamination—with savings up to 50% in material costs. These and other benefits, like fast heat-up, easier cleaning and low maintenance, can be obtained from 16 cladding materials—various types of stainless, nickel, Inconel, Monel, copper.

These are supplied with a standard sodium hydride finish, or may be polished to help improve performance characteristics. When you're thinking of new tanks and vessels, qualified equipment builders can help your engineers and consultants take advantage of versatile Lukens' Clad Steels. We work closely with the fabricators to help select the type most suited to your processing needs. To get more information, ask one of your equipment builders, or write Manager, Marketing Service, Lukens Steel Company, 753 Lukens Building, Coatesville, Pennsylvania.

LUKENS CLAD STEELS

STAINLESS-CLAD · NICKEL-CLAD · INCONEL-CLAD · MONEL-CLAD

PRODUCER OF THE WIDEST RANGE OF TYPES AND SIZES OF CLAD STEEL PLATES AND HEADS AVAILABLE

a newly developed power-shift transmission.

The clutch pedal has been eliminated and all shifts through all speed ranges in both forward and reverse can be made without coming to a stop or even slowing down.

Operating cycles of larger capacity tractor-shovels are slower because heavier load requirements make it necessary to frequently shift between "working" and "travel" speed ranges. The power-shift transmission simplifies the driver's work and adds to the speed and productive capacity of the machine.

Pry-out bucket action is accomplished by using breakout pads on the ground as a fulcrum for leverage. Opposing load forces are transferred to the ground through the pads during the "breakout", instead of to the axles, wheels and hydraulic system. The 40 degrees of bucket breakout which is accomplished at ground level permits retaining larger heaped loads. Overall length of the machine is less with the bucket at this ground level "carry" position than with the bucket in digging position.

A combination of being able to "cradle" the load closer to the machine, together with a longer wheelbase, provides maximum stability.

Underslung design and position of the boom-arm gives the driver new safety and better visibility. The need for safety guards or screens to protect the driver from the boom-arms during raising and lowering operations has been eliminated.

The new model has more horsepower and weight in relation to the two cubic yard capacity than other standard makes. Lifting and dumping height of the HO is greater than average and the model is available with either gasoline or diesel power.

An adjustable seat with molded foam-rubber and one-piece frame, provides maximum driver comfort.

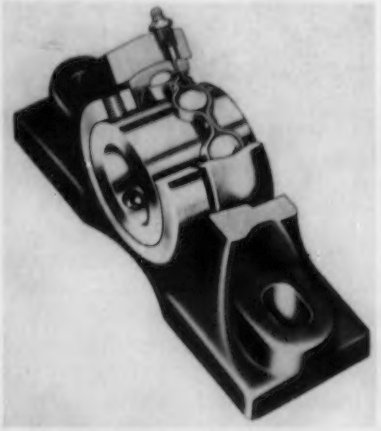
Other features included in the loader models are sealed, pressure-controlled hydraulic system; 12-volt battery system on the gas-powered model with battery box and hydraulic oil reservoir mounted behind driver's seat; torque converter; double-acting hydraulic rams with chrome-plated piston rods; vacuum-boosted, 4-wheel hydraulic brakes and power steering are standard. A load-shock accumulator device is optional.

Both head and rear driving lights as well as tail lights are standard and an exterior pick-off outlet for outside hydraulic circuit use with auxiliary equipment is also included.

Tape Opener Prevents Tears

An easy-starting Snap-Open Tab has been developed for the complete line of sealing tapes made by Hudson Pulp & Paper Corp., 477 Madison Ave., New York 22, N.Y. The tab holds the roll securely closed, yet ready to be snapped open with a simple pull. Use of the tab opener is said to make starting a new roll faster and easier. Tape waste in opening is reduced to less than three inches, it is claimed.

Loading of tape dispensers is also speeded up, because the new tab opens the roll cleanly, without jagged edges.



Medium-Duty Bearings Feature Metal Backed Synthetic Seals

An additional line of ball bearings designed for medium duty service conditions has been added by the Dodge Manufacturing Corp., Mishawaka, Indiana. Designated as SCM Ball Bearings, the units provide more load-carrying capacity and are available in larger shaft sizes than previous models of this type. The new bearings include both pillow blocks and flange cartridge mounts.

Rugged semi-steel outer housing of the pillow blocks provides greater strength, and self alignment is provided by the spherical outer race of the ball bearing inner unit, which fits into the spherical seat in the semi-steel housing.

Metallic-backed synthetic seals are mechanically anchored in position and will not blow under grease gun pressure. The lubricant is effectively sealed in; dust and dirt are excluded.

A locking pin prevents rotation of the outer bearing race while allowing full self-alignment. The bearing is securely attached to the shaft by means of two set screws through the collar at 120 degrees.

The bearing units are completely assembled, factory adjusted, pre-lubricated, and ready to mount on the shaft. Both pillow blocks and flange cartridge mounts are now available from factory and distributors' stocks in most transmission sizes.

Pallet Dolly Line In Light-Weight Design

A completely re-designed line of magnesium pallet dollies is announced by Magnesium Company of America, East Chicago 19, Ind.

Constructed of extruded magnesium frames, hardened steel axles, and phenolic resin rollers with factory-lubricated sealed bearings, the units feature:

Tilt construction, rounded-side rollers and heavy-duty roller bearings to assure easy manual movement and 360° turning.

The pallet dollies are available in capacities to 4000 lbs. The average model weighs only 37 lbs., and a range of sizes between 36″ x 36″ and 48″ x 48″ are available.

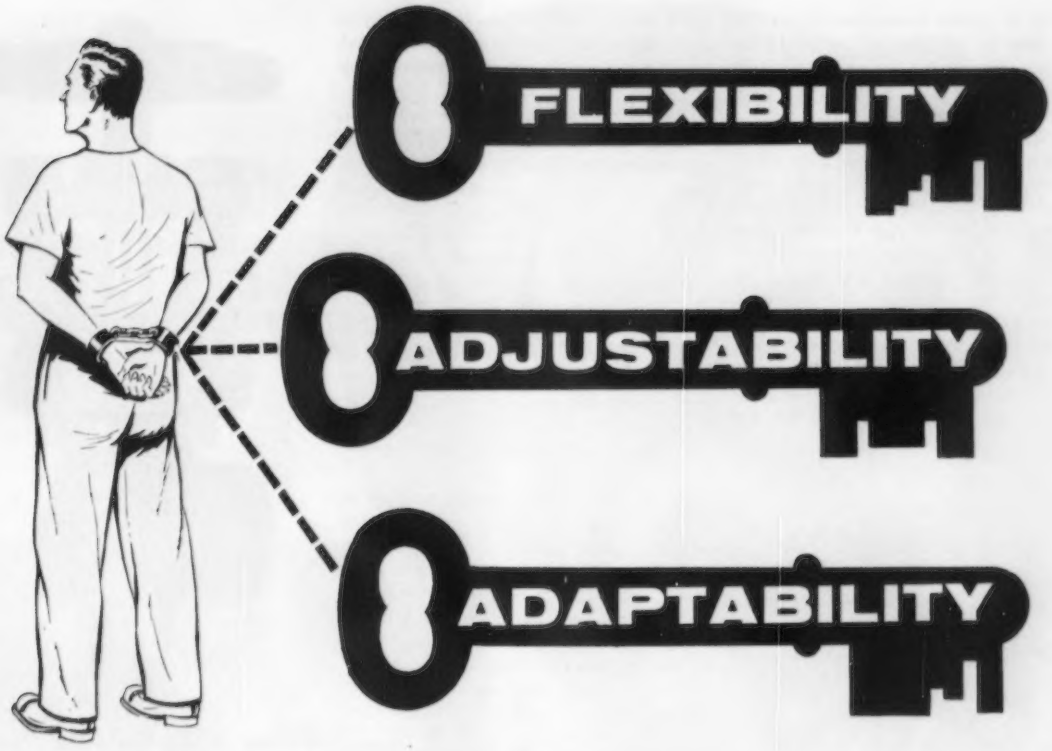
Interchangeability of parts permits or removing rollers to increase or decrease capacity, or to replace a part if necessary.

Loading Ramp Features Adjustment Upward

A ramp for all truck loading and unloading requirements regardless of bed height is announced by Globe Hoist Co., E. Mermaid Lane at Queen St., Philadelphia 18, Pa.

Called "Trans-O-Matic", the unit's automatic floating action allows the ramp lip to ride with the fluctuating height of the truck bed as load weight changes. When not in use, the ramp can be positioned at platform level to permit normal dock cross-over traffic and heavy storage loads. An automatic safety switch under the ramp lip locks the unit if the truck pulls suddenly away.

Installation of the product is relatively easy. No ground excavation or piping is

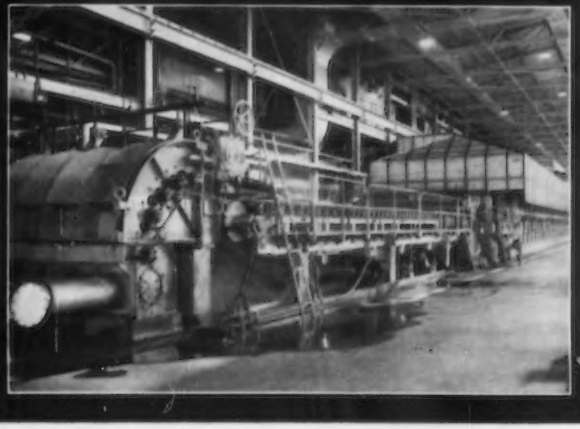


These are the three "Valley" keys that will unshackle your supervisor's full resourcefulness.

Without them, he stands handcuffed in front of his machine — unable, without a shutdown, to change a setting that is turning out "reject" tonnage.

With the aid of these keys, he can make that multi-million dollar paper machine pay the extra dividends it should.

No mill equipment is more costly than an outmoded slice. That is why . . .



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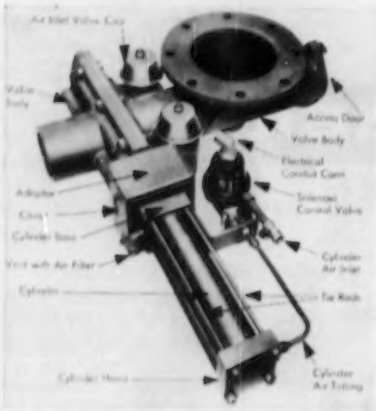
Canadian Representatives: Pulp & Paper Mill Accessories Ltd., P.O. Box 903, Station "O" Montreal 9, Quebec

required. A simple connection of an A-C power line is all that is needed. The ramp is shipped in a semi-assembled state, complete with dock hinge and push-button controls.

The lip travels through a 30 inch arc, moving up or down 15 inches from loading dock level. A non-skid deck, constructed of $\frac{3}{8}$ inch checkered steel plate measures 6 feet by 8 feet 4 inches. The entire power assembly, consisting of motor, pump, reservoir and valves is contained in a compact weather-protected unit located under the ramp between the platform reinforcing members. To give the ramp continuous support along the dock edge, five cast steel hinges, welded to mounting plate, are bolted to the platform.



Self-Feeding Solid Materials Valve Features Non-Plugging Operation

The availability of a new line of Type C materials handling valves, designed for flow control in the pneumatic transport of fine solid materials, is announced by the Allen-Sherman-Hoff Co., 259 E. Lancaster Ave., Wynnewood, Pa. The valves are self-feeding, non-plugging, have positive shut-off, maximum carrying capacity, minimum frictional wear, and maintenance ease. The units are available with either air-electric, remote or manual controls.

A self-feeding feature of the valves eliminates plugging. Atmospheric air, admitted into the vacuum system through the inlet ports, continuously picks up and sweeps material through the valve and into the transport piping, at rates matched automatically to the increases and decreases of the load in the system. Because the rate of feeding is continuous and commensurate with the airflow, there is never any sudden application of full vacuum to plug the system.

Sliding shut-off gates are also provided for better protection against leakage than older flap or rotary types. The design of the slide gate mechanism allows the vacuum in the system to remove material which could cause clogging and to hold the gate tightly against the seat when the valve is closed, insuring positive shut-off.

The units permit maximum utilization of the carrying capacity of the piping system because high material concentrations permit the use of smaller diameter transport piping. Therefore, the manufacturer points out, a valve having a 4 inch diameter outlet is large enough to accommodate the handling rates of 4, 5, and 6 inch transport piping systems.

Because the material is transported at maximum concentration over the full pipe area, the bulk of the material does not come into contact with the pipe walls, which minimizes wear from the sandblasting effect typical with low material concentrations.

Access door in line with centerline of piping system and plug valve in bottom of valve body permit quick inspection and entrance into the valve for maintenance and adjustment. Maintenance can be performed on one valve without interfering with the operation of other valves in the system. Air inlet port openings can be adjusted to accommodate different materials, to control the draft in each collecting hopper and to prevent air infiltration during collecting periods simply by turning a nut on an adjusting screw.

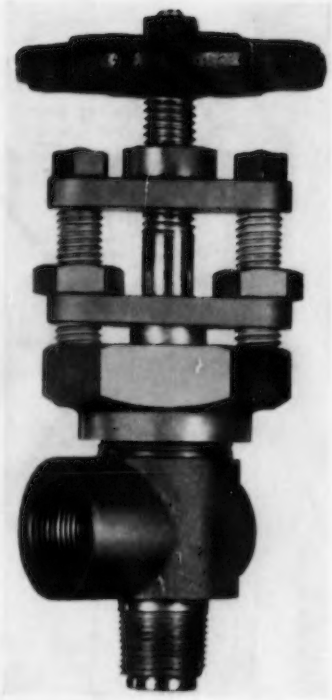
For air-electric operation, valves are equipped with air cylinders controlled by 3-way solenoid valves. For remote operation, the units are equipped with air cylinders controlled with 3-way valves mounted on a central control panel. Push-pull rods (where valves are hand high) are chainwheels and hand chain are provided for manual installations.

Pulley With Non-Lubrication Features

A low-cost $\frac{3}{4}$ hp. variable speed pulley that can be adapted to new or old equipment has been developed by Lovejoy Flexible Coupling Co., 4869 West Lake St., Chicago 44, Illinois. A minimum number of parts are used, for reductions in upkeep and maintenance. Oil impregnated bronze bearings are incorporated which eliminate the necessity of lubrication for the life of the unit.

The pulley delivers a speed ratio of $2\frac{3}{4}$ to 1, using an A section belt. Maximum bore is $\frac{7}{8}$ inch with keyway. The shaft bore runs through the entire length of the pulley, allowing reverse mounting when necessary on special installations.

The spring cover of older models has been eliminated, since in the majority of cases the pulley is used in the enclosed portion of the machinery. The entire unit measures 4-13/16 inches overall length, and 6 inches in diameter. Weight is $6\frac{1}{2}$ lbs.



Valve With Outside Seated Stem

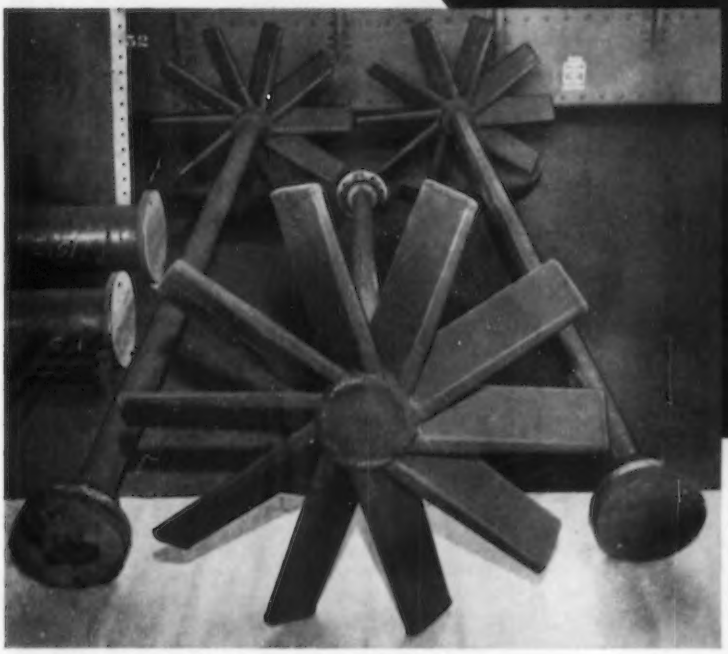
The No. 23 sampling valve recently announced by Jerguson Gage & Valve Company, 80 Fellsway, Somerville 45, Massachusetts is completely self draining, for the valve stem seats on the outside of the valve body. The unit is suitable for installations where it is desirable to have the valve seat inside the wall of a vessel in order to prevent liquid from remaining in the nipple and valve.

Of sturdy design, the valve product has outside screw and yoke construction to meet high temperature or corrosive conditions where inside threads cannot be tolerated. The efficient outside thread design eliminates possible freezing and allows the valve stem to work freely at all times. The unit is foolproof in operation, for the stem is constructed with a left-hand thread, thus allowing the valve handle to operate in the normal direction of standard valves.

Optional features include construction with an additional outlet for such uses as a steaming out connection, or with a reamer on the end of the stem to break away encrusted matter which may have collected on the inside vessel wall.

The product is recommended for pressures up to 4000 lbs. at 100° F. or 1000 lbs. at 750° F. Standard with $\frac{3}{4}$" N.P.T. Male Tank Connection and $\frac{3}{4}$" N.P.T. Female Drain Connection. The weight is $4\frac{1}{2}$ lbs. Standard materials are carbon steel body, stainless steel stem, and stellited seat. Optional materials include various special alloys to meet corrosive or other troublesome conditions.

Immune to the effects of bleaching solutions



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PAPER PEOPLE

R. B. Robertson

Approves Robertson For Defense Post

Reuben B. Robertson Jr., won the approval of the Senate Armed Services Committee for appointment as Deputy Secretary of Defense after having divested himself of two stock holdings.

The Senate itself will now have to act on the nomination for the second highest defense post.

The committee decided this morning that Mr. Robertson would have to divest himself of seventy-five shares of stock in B. F. Goodrich Company and 340 shares in Procter & Gamble to conform with its policy of requiring defense officials to have no financial connections with defense contractors.

Mr. Robertson agreed. In the afternoon he sent a letter saying he had sold the stock and resigned his directorates in the two companies. Thereupon the committee in executive session approved his nomination.

Senator Richard B. Russell, Democrat of Georgia, committee chairman, said the committee had granted Mr. Robertson's request to retain a directorate in the Champion Paper and Fibre Company, of which he is president and with which he has been connected since 1930. He was also allowed to keep a directorate in the related Dairypak, Inc. He will resign the presidency of Champion.

Mr. Robertson also volunteered to give up a directorate in the Cincinnati and Suburban Bell Telephone Co.

Senator Russell said that the Champion company, while it had sold paper to other Government agencies in 1954, did no business with the Defense Department. Hence the committee saw no conflict of interest and also concluded that his retention of the directorate in the two companies would not take up too much of his time.

C-Z Names Abel Northwest Traffic Mgr.

G. A. Abel has been named Northwest traffic manager for Crown Zellerbach Corp., as of Aug. 1. Formerly with the company's traffic department in San Francisco, Mr. Abel has for the past 18 months been traffic manager of Waterway Terminals, a C-Z subsidiary. In his new post he will succeed R. F. Ditewig, who has been named to the newly created position of Western Transportation Co. traffic manager. J. F. Maney, who has been ten years in service with Crown as assistant Northwest traffic manager, will become traffic manager of Waterway Terminals.

William H. Purring Joins Riegel

Mr. William H. Purring has joined Riegel Paper Corp.'s sales staff and will specialize in packaging papers

Mr. Purring is well known in the packaging industry. He was on the sales staff of Reynolds Metals Co. for eight years, and most recently was sales manager of American Colortype Co. Mr. Purring will make his headquarters in the New York Office.

C. V. Morris Named Asst. To H. E. Gould

Harry E. Gould, president of Reinhold-Gould, Inc. and Aldine Paper Company, wholesale paper distributing companies of 535 Fifth Avenue, New York, has named Charles V. Morris, prominent paper trade executive, as his administrative assistant.

Gilman Promotes Three

Gilman Paper Co., manufacturer and converter, of 630 Fifth Avenue, New York, has announced three promotions.

Larry K. Norton is now assistant vice-president and sales manager of the Standard Products Division—responsible for gummed tape, reinforced tape, veneer tape, stay tape, wrapping Kraft and Cellufiltercord.

Homer Lake is now assistant vice-president and sales manager in charge of bleached and unbleached pulp and specialty papers.

F. L. Munger is now vice-president and sales manager of Kraft Bag Corp., Gilman's bag manufacturing subsidiary.

Gilman Paper Co. and subsidiaries operate two fully integrated plants at St. Mary's Ga. and Gilman, Vt.

Collie Named Art Director Of Gairs' Container Div.

Stafford D. Collie has been appointed art director of the container division of Robert Gair Co., Inc., reporting to Alfred W. Hoffman, manager of container products development and sales promotion.

Mr. Collie had been art director at the subsidiary Gair Co., Canada Ltd., Toronto, Ont. He previously headed the industrial design department at the Ontario College of Art.

Schulenburg Heads Info. Serv. of Wisconsin Paper Industry

M. J. Schulenburg, public relations director of the Kimberly-Clark Corp., Neenah, has been elected general chairman of the Information Service of the Wisconsin Paper Industry, an association of 19 paper firms for the study and development of better paper mill and community relations.

Elected vice chairman were Ira Boyce, assistant to the president, Consolidated Water Power and Paper Co., Stevens Point, and H. R. Moore, secretary, Bergstrom Paper Co., Neenah. A. C. Haselow, treasurer of the Gilbert Paper Co., Menasha, was re-elected treasurer for his fifth term. John McCune, Neenah, continues as secretary and co-ordinator.

Members of the group's executive committee include: Walter Adrian, vice-president, Badger Paper Mills, Peshtigo; H. G. Wintgens, vice-president, Charmin Paper Mills, Green Bay; Bruce Boerner, director of industrial relations, Cornell Paperboard Products Co., Cornell; Carl Geisler, vice president, Marathan Corp., Menasha; Leo Schubart, president, Neenah Paper Co., Neenah; Keith Roberts, director of public relations, Nekoosa-Edwards Paper Co., Port Edwards; B. R. Cancell, president, Rhinelander Paper Co., Rhinelander; C. R. Seaborne, vice-president, Thilmany Pulp and Paper Co., Kaukauna; D. B. Smith, president, Wausau Paper Mills, Brokaw, and E. C. Hilfert, president, Riverside Paper Corp., Appleton.

Pays off in profits... Guards public relations

This SO_2 recovery system in a Florida pulp mill gives a substantial return on its investment. It saves large amounts of sulfur and steam. Of great importance, too, it prevents discharged gases from becoming a public nuisance. Long service life and low maintenance costs are assured because the stack, absorption tower and 72-inch ductwork are made of Armco Type 317 Stainless Steel.

This stainless steel is a chromium-nickel type with 3 to 4% molybdenum content. It is often used to resist the more severe types of corrosion associated with the sulfite processes, and for which Type 316 may not be quite adequate.

Armco produces all standard types of stainless steel and special types, too, including the ELC grades with only 0.03% carbon max. Known as Types 304L and 316L, they are resistant to severely corrosive conditions in the "as welded" condition at service temperatures under 800 F.

Our engineers will be glad to confer with you and your equipment builder about stainless steel pulp and paper mill applications. Just write us at the address below.

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G. W. E. Nicholson

Union Bag Advances Nicholson and Dunn

G. W. E. Nicholson, executive vice-president in charge of manufacturer, has been appointed to the position of executive vice-president in charge of future planning and expansion and T. T. Dunn, formerly vice-president and resident manager has been named vice-president in charge of manufacturing of Union Bag and Paper Corp.

Mr. Nicholson will be responsible for correlating company expansion plans, and Mr. Dunn will assume responsibility for all manufacturing and woodlands operations in the company. Mr. Nicholson will continue to have his offices in New York City and Mr. Dunn will have his headquarters at Savannah.

Mr. Dunn will have charge of manufacturing at Savannah and at the Chicago and Trenton Box Plants and the St. Louis Multiwal Bag Plant.

Mr. Nicholson has been with Union Bag and Paper Corp. since 1941, serving in an executive capacity since that time. He is a former resident manager of the Savannah plant, which position he held for approximately five years.

Mr. Dunn joined Union Bag in 1940 as assistant general superintendent and for several years was in charge of the construction program at the Savannah plant. Later he was manager of the pulp and paper division, and for the past ten years has been the company executive in charge of Savannah operations.

Lientz and Charbonnier Also Move Up At Union

J. R. Lientz was named manager of the Savannah plant of Union Bag and H. Y. Charbonnier was appointed manager of the pulp and paper division.

Mr. Lientz became associated with Union Bag in 1946 and for the past three years has been manager of the pulp and paper division. As plant manager he will be responsible for the pulp and paper division, the Savannah box division, the Savannah bag division, the technical division, industrial relations division and the planning and scheduling department.

Mr. Charbonnier joined the company in 1941 and for several years was assistant manager of the technical division. He was named assistant manager of the pulp and paper division in 1952.

In another change, John T. Harrison, a former manager of the bag division at Savannah and manager for the past three years of the company's Chicago box plant, was named manager of northern factories.

Mr. Harrison will be in charge of manufacturing at box factories in Trenton and Chicago and a bag factory at St. Louis.

Jones Named Sales Mgr. of Gair Plastafol

Christopher Peter Jones has been appointed sales manager of the Plastafol department, folding cartons division, of Robert Gair Co., Inc., New York.

Mr. Jones joined Gair in the early fifties as a multiple-packaging salesman. Previously, he had worked as a salesman of heavy duty bags for industrial products.

Champion Changes

Among Champion Paper organizational changes at the company's Carolina Division, Canton, N. C., A. M. Buck Fairbrother was named assistant division manager, while Carl T. Welte succeeds Mr. Fairbrother as production manager.

Danielson Named Scott Retail Sales Mgr.

Albert J. Danielson has been appointed district manager of the Wilmington, Del., retail sales territory of the Scott Paper Company, Chester, Pa.

Mr. Danielson, associated with the Scott distribution organization for 23 years, joined the company in 1932 as a retail salesman. He has been district manager in Portland, Ore., Providence, R. I., New Haven, Conn., New York City, and the northern New Jersey sales territory.

He replaces Richard G. High, who has been appointed Syracuse retail district manager.

John L. Clouse, Sr.

Oxford Miami Promotes Clouse and Ozias

C. H. Claypool, mill manager of the Oxford Miami Paper Co., West Carrolton, Ohio, announced July 22 the appointment of John L. Clouse, Sr. to the position of technical assistant to the mill manager. Mr. Clouse was chief chemist previous to the appointment. In his new position, Mr. Clouse will serve as technical advisor on matters pertaining to quality and processing of the company's products.

Mr. Clouse joined the Oxford Miami Paper Co. in 1928 as an Antioch College cooperative student. He joined the company on a permanent basis as assistant chemist in 1934. He was named senior chemist in 1941 and chief chemist in 1946.

Mr. Clouse is a veteran paper chemist with many years of consultation and trouble shooting experience in the field of paper and in graphic arts relationship.

He is a former chairman of Ohio TAPPI and a current chairman of National TAPPI's Deinking Committee.

At the same time, the company announced the promotion of James H. Ozias to the position of assistant general superintendent. Mr. Ozias will assist general superintendent Robert Beckett. In addition to his new duties, he will maintain his position as production control supervisor.

Mr. Ozias began his association with the paper firm in 1946 as timekeeper. He held subsequent posts of payroll supervisor and assistant production control manager. He was named production control supervisor in 1951.

NEWS OF ASSOCIATIONS

AMA Schedules Management Course and Round Table

Ninety American and Canadian corporate chief executives will participate August 15-19, in two special meetings for presidents to be sponsored this summer by the American Management Assn.

Both meetings will be part of the association's first series of summer activities, to be held in Hamilton, N. Y. Facilities on the campus of Colgate University have been made available for the summer program, which will include 21 small-group seminars on specific management subjects and courses for business executives in management principles, marketing management, and cost reduction.

Thirty presidents will exchange advice, experience, and thinking on their most important problems at the Presidents' Round Table. The purpose of this one-week meeting is to enable heads of companies to talk over with other presidents problems that are peculiar to top management, many of which they cannot discuss freely with anyone in their own organizations.

The round table will be conducted almost exclusively by means of informal discussion, without lectures or formal speeches. Guests prominent in management will join the group from time to time. The discussion agenda will be developed by the participants themselves, based on the problems of major concern to them.

Sixty presidents will attend the Management Course for Presidents, a one-week course in advanced management for chief executives, scheduled for Aug. 1-5. It will deal with those aspects of company organization, planning, and control, and of management selection, appraisal, and development that are of primary concern to the corporate chief executive. The program will include lectures by A.M.A. staff members and visiting business executives as well as group discussion.

Additional information about either meeting may be obtained by writing Registrar, School of Management, American Management Association, 330 West 42nd St., New York 36, N. Y.

Superintendents Local Meeting Dates

Date	Division	Place
Sept. 1-3	New York-Canadian	Saranac Inn Upper Saranac Lake, N. Y.
Sept. 16-17	Northwestern Div. (Fall Meeting)	Hotel Northland Green Bay, Wis.
Sept. 22-24	Northeastern (Annual)	Poland Spring House Poland Spring, Me.
Oct. 4-6	Southern and Southeastern	Oglethorpe Hotel Savannah, Ga.
Oct. 21-22	Penn-Jer-Del Fall Meeting	Pocono Manor Inn Mt. Pocono, Pa.
Dec. 1-3	Pacific Coast Div. (Annual)	Winthrop Hotel Tacoma, Wash.

TAPPI Local Meeting Dates

Date	Section	Place
Sept. 13	Empire State Metropolitan	Fraunces Tavern New York, N. Y.
Oct. 14-15	Joint—New England	Curtis Hotel Lenox, Mass.

National Meetings are shown under "Remember These Dates" on page 5.

A. A. R. Seminar To Teach Proper Bag and Box Loading

The manufacture and use of paper and paperboard containers will be one subject of discussion during the Second Shipper Seminar next month. Thirty shipper representatives will attend the course of instruction (August 1-5), which will be held at the Container & Loading Research & Development Laboratory of the Assn. of American Railroads. The lab is located on the campus of Illinois Institute of Technology, Chicago, Ill.

The program is divided into 53 separate events stretching over the five-day period. In addition to lectures on the manufacture and use of paper containers, crates, barrels, skids, drums, pallets, etc. there will be carloading demonstrations and lab testing demonstrations devoted to fiberboard boxes and bags.

Trade Association Out to Boost Writing Paper Sales

With good values available at prices ranging from a few cents a package up to a few dollars a box, correspondence writing paper sales are scheduled for promotion emphasis during the 18th annual National Letter Writing Week, October 2 to 8. According to report, every retailer of writing paper in the country has an opportunity to participate in the annual volume-building project sponsored by the Paper Stationery and Tablet Manufacturers Assn., 527 Fifth Ave., New York City. Nearly every manufacturer of any size or significance in the United States is affiliated with the association, it is said.

There is no charge to a retail merchant for participating in the promotion project, according to William Rodgers, research director of the association.

"All a retailer needs to join in this effort is the merchandise to display and sell," Mr. Rodgers said. "There is a growing vitality and interest in correspondence writing paper. New lines of merchandise are better than ever. From the standpoint of design, merchandising and beauty they lend themselves to display and promotion.

NEWS OF SUPPLIERS

• S. & S. CORRUGATED PAPER MACHINERY CO., INC., of Brooklyn, announces the election of Mitchel Flaum as its president. Mr. Flaum, who is an engineer, has been active in all phases of the business since joining the company in 1940. He succeeded L. W. Roselius.

• BATTELLE MEMORIAL INSTITUTE, Columbus, Ohio, has made three vice-presidential appointments. They are: Dr. B. D. Thomas, David C. Minton, Jr., and John S. Crout. All three have long been associate directors of the research organization, and, along with Dr. Williams, comprise the key policy-making and executive team in Battelle management.

• GENERAL ELECTRIC CO. has appointed Charles P. Page manufacturing engineering specialist for the Distribution Assemblies Department at Plainville, Conn. He will be responsible for formulating and recommending new and revised manufacturing methods and processes involving the development of plant layout and material handling methods, and the recommendation of sources of supply for tools, dies, and other facilities.

Mr. Page joined General Electric in 1953. Previous to his present appointment, he was manufacturing project engineer in the Trumbull Components Department of General Electric.

CHAS. T. MAIN, INC.
CONSULTING ENGINEERS
Process Studies, Design, Specifications and Engineering Supervision
PULP AND PAPER MILLS
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Figures of the Week

PAPER PRODUCTION RATIO REPORT

(Production as percent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

1955	June 18 97.1	June 25 96.9	July 2 95.1	July 9 62.7r	July 16 89.7
1954	June 19 92.5	June 26 92.3	July 3 81.5	July 10 50.4	July 17 84.3

r Revised.

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1954	93.3	94.0	93.1	92.2	93.7	89.3	79.1	92.1	89.8	94.6	93.8	86.2	91.6
1955	93.6‡	95.1‡	96.9‡	96.3‡	97.5‡	95.4‡							

‡ Preliminary.

COMPARATIVE YEARLY SUMMARIES

	1948	1949	1950	1951	1952	1953	1954	1955
Year to Date	93.6	80.9	94.2	99.9	90.9	92.6	91.4	94.6
Year Average	92.1	83.7	95.8	98.0	88.6	92.3	91.6	

PAPERBOARD OPERATING RATIOS†

1955	June 18 99	June 25 99	July 2 96	July 9 55	July 16 77	
1954	June 19 91	June 26 92	July 3 84	July 10 46	July 17 71	

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1954	89	89	90	88	90	89	74	92	88	94	93	82	88
1955	92	95	96	94	97	97							

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: In the above tables all the ratios shown are on the basis of a normal 6 and 7 day capacity.

† Percents of operation based on "Inch-Hours" reported on a 6-day basis to the National Paperboard Association.

SUMMARY OF PAPERBOARD STATISTICS—National Paperboard Ass'n. Figures

ITEM	THIS WEEK ENDING July 16, 1955	LAST WEEK ENDING July 9,1955	CUMULATIVE TO DATE January 1, 1955 to July 16, 1955
% Activity	77%	55%	93%
Total Production (Tons)	225,674	155,704	7,243,783
Liner	89,859	58,606	2,470,383
Corrugating Material	33,297	27,974	1,097,415
Chip & Filler Board	5,697	3,911	164,055
Total Containerboard	128,853	90,491	3,731,853
Folding	35,330	22,390	1,351,414
Set-Up	6,733	4,293	335,337
Special Food Board	21,740	16,078	596,240
Other	33,018	22,452	1,228,939
Total Boxboard	96,821	65,213	3,511,930
Total Orders			
Received	228,679	225,732	
Unfilled At End of Week	642,619	642,257	

"EXCELSIOR" FELTS

The Trademark of Felts of Superior Quality for Every Grade of Pulp and Paper

KNOX WOOLEN COMPANY
CAMDEN, MAINE

PRICES OF FIBERS

MARKET WOOD PULP

Third Quarter Contract Prices Per Short Air-Dry Ton

	Delivered Basis		Varying Freight Allowances†		
	U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$75.00/ 90.00	‡$55.00/ —	§$78.00/ 85.00§	§$80.00/ 82.50	§77.50/ 90.00
Kraft, Blchd.	147.00/152.50	150.00/155.00	§145.00/147.00§		
Kraft, Blchd. Hdwd	145.00/ —		§135.00/ —		
Kraft, Semi-bleached	130.00/135.00	130.00/135.00	§137.50/140.00§	*135.00/137.50*	
Kraft, Unbl.	110.00/115.00	110.00/115.00	†110.00/115.00†	*110.00/140.00*	
Sulphite, Blchd.	145.00/ —	145.00/ —	†145.00/150.00	145.00/ — *	142.50/145.00
Sulphite, Unblchd.	125.00/ —	125.00/ —	†125.00/ —	*125.00/130.00	
Sulphite, Unbl. Gt'sn		129.00/ —	†129.00/ —		
Soda, Blchd.	142.50/145.00	142.50/145.00			

‡ F.o.b. Shipping Point. § On Dock Atlantic Ports. * Freight allowed.

NEW YORK RAG MARKET

New Domestic Cotton Cuttings

Delivered Mill Basis
PRICES NOMINAL

	Per 100 lbs.
No 1 White Shirts	$15.25/ 15.75
No 1 Unblchd. Muslins	17.50/ 18.00
Blchd. & Unblchd. Underwears	17.50/ 18.00
No 1 Light Silesias	7.75/ 8.50
No 1 Light Blue Overalls	9.50/ 10.00
Percales	7.50/ 8.00
No. 1 Light Prints	5.75/ 6.25
Suntan Khakis	6.50/ 7.00
Cottonades	4.00/ 4.50
No. 1 Washables	3.25/ 3.50

Old Domestic Cotton Rags

(Prices to Dealers, F.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$3.50/ 4.00
Cotton Pants & Overalls	2.25/ 2.50
Thirds and Blues, Repacked	1.65/ 1.75
No. 2 Roofing Rags	27.00/28.00

COTTON LINTERS

Memphis Market

F.o.b. Oilmills

	Apr. 11 Per 100 lbs.
Grade 1 n.a.	
2	$9.50/ $7.50
3 1st cut—felting	7.00/ 5.80
4	5.25/ 4.25
5	4.00/ 3.00
6 *2nd cut—chemical	2.60/ 2.50
7	2.50/ —

*Based on 73% cellulose.

Bagging

(Prices to Dealers, F.o.b. N. Y.)

	Per 100 lbs.
Foreign Gunny	$5.00/$5.25
Foreign Scrap Burlap	4.75/ 5.50
Heavy Wool Tares	6.50/ —
Austr. Wool Pouches	4.75/ 5.25
Domestic Manila Rope	5.50/ 6.00
Domestic No. 1 Sisal Strings	4.25/ 4.50

WASTE PAPER MARKET

Mill Prices, f.o.b. Trucks Shipping Point - Includes Brokerage

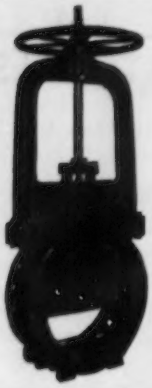
These quotations are a partial indication of the price range on volume tonnage in each market on the date specified, as gathered from major dealers. SPECIAL PACKINGS AND SPOT TONNAGE NOT INCLUDED. Prices nominal.

	New York	Boston	Chicago	Los Angeles
	July 25	July 25	July 25	July 25
No. 1 Mixed Paper	$14.00/ 16.00	$16.00/ —	$12.00/ 14.00	$13.00/ —
No. 1 News	18.00/ 20.00§	15.00/ 16.00	18.00/ —	14.00/ —
Overissue News	19.00/ 24.00	17.00/ 19.00	21.00/ 23.00	13.00/ —
Mill Wrappers	17.00/ 21.00	17.00/ —	14.00/ —	13.00/ —
Old Corrugated Containers	33.00/ 34.00	30.00/ 31.00	31.00/ —	20.00/ —
Super Resorted Kraft Paper	37.50/ 50.00	45.00/ 50.00	45.00/ 50.00	45.00/ —
New Double Kr. Ld. Corr. Cuts	42.50/ 60.00	47.50/ 60.00	45.00/ 60.00	35.00/ 40.00
New 100% Kraft Corr. Cuts	55.00/ 60.00	55.00/ 65.00	60.00/ —	— / —
New Br. Kraft Env. Cuts	75.00/ 85.00	80.00/ 85.00	65.00/ —	50.00/ —
New Br. Kr. Bag Waste Prntd.	55.00/ 70.00	60.00/ 65.00	55.00/ —	— / —
New Br. Kr. Bag Waste Unprntd	65.00/ 75.00	70.00/ 80.00	75.00/ —	— / —
No. 1 Groundwood Shvs.	25.00/ 40.00	28.00/ 32.00	25.00/ 30.00	27.00/ 30.00
White Newsblanks	65.00/ 70.00	57.50/ 65.00	50.00/ 55.00	55.00/ —
No. 1 Soft Wht. Shvs.	75.00/ 80.00	75.00/ 80.00	70.00/ 75.00	— / —
Hd. Wht. Shvs.	108.00/110.00	100.00/110.00	110.00/ —	95.00/100.00
Hd. Wht. Env. Cuts	135.00/ —	120.00/135.00	110.00/ —	105.00/110.00
Col. Tab. Cards	65.00/ 70.00	70.00/ 72.50	50.00/ 55.00	28.00/ 39.00
Manila Tab. Cards, bales	90.00/ 95.00	90.00/ 95.00	85.00/ 90.00	62.00/ 64.00
No. 1 Col. Ledger	40.00/ 45.00	42.50/ 45.00	45.00/ —	25.00/ 29.00
White Ledger	60.00/ 65.00	65.00/ 70.00	60.00/ 65.00	45.00/ —
Mixed Book & Mag.†	23.00/ 25.00	25.00/ 26.00	15.00/ —	— / —
No. 1 Rep'd. Hvy. Books‡	27.00/ 35.00	31.00/ —	34.00/ 35.00	— / —

† Includes Time & Life; no coarse groundwood. ‡Not to exceed 10% groundwood. § Deld.

PRICES OF MATERIALS

Aluminum sulphate:		
cml. bags, c.l. wks.	cwt.	$1.85 / —
iron-free, c.l. wks.	cwt.	3.55 / —
Casein, acid prec.:		
dom. sh. pt. c.l.	lb.	28.00 /29.00
Arg. ex. dock, duty paid.		23.50 /24.00
New Zeal., do.		25.00 /26.00
Caustic soda:		
c.l. wks. solid, 76%	cwt.	3.85 / —
flak. & grd. 400-lb. drums, c.l.		4.25 / —
liquid 50% tanks		2.70 / —
liquid 70% tanks		2.80 / —
China clay:		
dom. air-float, c.l. wks.	ton	10.00
water-washed, lump, filler.	ton	11.00
coating	ton	17.60 /30.50
Imported, ex. ship. short tons		20.00 /35.00
Chlorine:		
single-unit tanks, works.	cwt.	2.93 / —
multiple unit, 2-5 cars per yr.		3.80 / 5.00
Formaldehyde:		
USP, inh. dms. c.l. wks.	lbs.	.0675/ —
lcl., E. wks.	lb.	.072 /.0725
Lime:		
hydrated bags, wks.	tons	10.00 /16.50
Gum rosin:		
K, M, N, drms, c.l. Savan,	cwt.	8.29 / 8.36
Rosin size:		
70%, gum & pale grds., tank cars, south, sh. pt.	cwt.	7.22 / 7.26
Salt cake:		
dom. bulk, 100% anh. wks.	ton	28.00 / —
imp. f.o.b. Saskatchewan.	ton	18.00 / Cana. funds
Soda ash:		
light, 58%, bags, wks.	cwt.	1.65 —
bulk	cwt.	1.35 —
Sodium silicate, 40° Be.:		
tank-cars, wks.	cwt.	1.00 / —
drums, c.l. wks.	cwt.	1.35 / —
(47°) Be. WW.		
tank-cars, wks.	cwt.	1.60 / —
drums, c.l. wks.	cwt.	1.95 / —
Sodium peroxide:		
dms. c.l. E. of Miss.	lb.	.186
l.c.l. do.	lb.	.191 / .196
Soybean, protein:		
chem. isol., wks. c.l. bags.	lb.	.23 / —
Sulphuric acid:		
60° Be. chys. c.l. wks.	cwt.	2.00 / —
l.c.l. wks.	cwt.	2.45 / —
tank-cars, wks.	ton	18.60 / —
Sulphur:		
crude, c.l. mines, contract,	long ton	26.50 / —
f.o.b. vessels Gulf.	do.	31.00 /33.00
Sulphur dioxide:		
liquid, coml. cyl., wks.	lb.	.10 / .12
multi-unit cars	lb.	.0535/
Starches:		
corn, multiwalls, c.l. prod. plant:		
pearl	cwt.	7.14 / —
white, dextrins	cwt.	7.55 / 7.80
chlorinated	cwt.	8.15 / —
potato, Idaho, c.l. wks.	cwt.	6.75 / —
East, fr. all. 50 cents cwt.		
potato, Maine, f.o.b. wks.	cwt.	7.25 / 7.35
Talc:		
domestic, sacks,		
c.l. wks., N.Y.	ton	27.00 /32.00
Titanium dioxide:		
anstase, c.l. deld. E. bags.	lb.	.22½/ —
l.c.l. deld	lb.	.23½/ —
rutile, c.l. deld.	lb.	.24½/ —
l.c.l. deld.	lb.	.25½/ —



RECORD PAPER & PULP STOCK VALVES "BONNETLESS" SELF CLEARING - - - "RESIDUE POCKETLESS TYPE"

METALS — I.B.B.M., all iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
- The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.
- The yoke mountings are such that yokes for various methods of gate operation are interchangeable.
- Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

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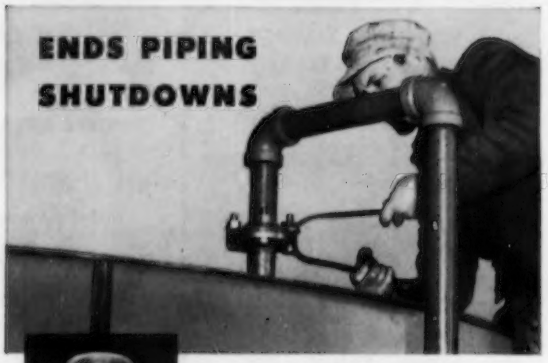

This PVC piping— with injection molded fittings—lasts and lasts

At this plant, unplasticized PVC piping handles sulfuric, nitric, muriatic, phosphoric, and acetic acids. Pressures range to 100 psi. This PVC piping, using Tube Turns Plastics' injection molded PVC fittings, has been in service for months, shows no signs of deterioration. Yet the metal and alloy metal piping it replaced failed at 3 to 12 months intervals from corrosive action. Cut your maintenance—eliminate shutdowns and hazards. Write for free booklet describing properties of unplasticized PVC fittings and flanges. Tube Turns Plastics, Inc., Dept. PF-8, 224 East Broadway, Louisville 1, Kentucky.

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PARIS BLACKS

Carbon blacks for all paper and board stocks—outstanding soft texture, particle fineness and jet black color. Takes well to the fiber, shows high retention.

Best for performance in the Beater and Jordan because of ease of wetting and ready dispersion in the furnish.

KOSMOS BRAND

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AND OTHER PRINCIPAL CITIES
CANADA: CANADIAN INDUSTRIES, LIMITED

Jordan Shell and Plug Fillings
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Reg. U. S. Pat. Off.
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THE BAHR BROTHERS MFG. CO.
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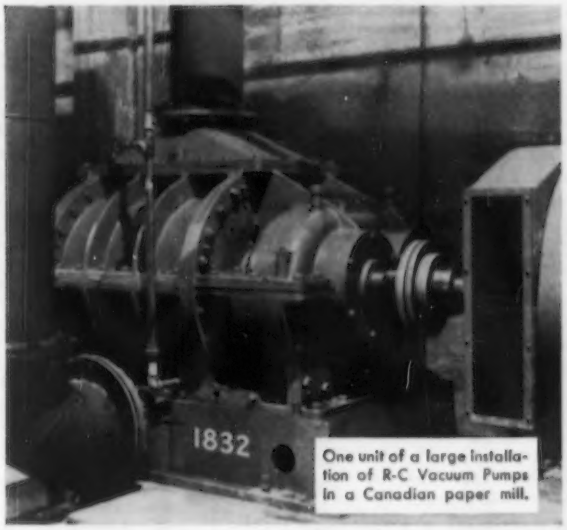
APPRAISALS • WATER PLANS • STEAM UTILIZATION •
STEAM POWER PLANTS • HYDRO-ELECTRIC • REPORTS



One unit of a large installation of R-C Vacuum Pumps in a Canadian paper mill.

You're sure of "BIG 4" values with R-C VACUUM PUMPS

This exclusive combination of Roots-Connersville advantages pays long-time dividends, such as you gain from no other vacuum pumps:

1 Reduced horsepower at higher speed
—power savings up to 25% and substantial reduction in first cost of motors result from operation at 600 rpm and up.

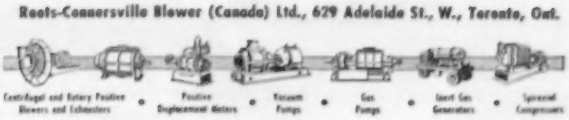
2 Long-time reliability and low maintenance
—simple design, without internal contacts or excessive wear, brings almost complete freedom from down time and lost production.

3 Small floor space—less expensive foundations
—because of large capacity per unit and direct connection to high-speed motors. Narrow widths especially adaptable to crowded space.

4 Minimum sealing water required
—from 4 gpm on small pumps to 40 gpm on largest units. Volumetric efficiencies are not adversely affected by changes in temperatures of sealing water.

For expansions or replacements, you will find it profitable to ask the R-C engineer to help you select the right vacuum pumps for your specific needs. Write for details in Bulletin 50-B-13.

ROOTS-CONNERSVILLE BLOWER
A DIVISION OF DRESSER INDUSTRIES, INC.
555 River Street, Connersville, Indiana
Roots-Connersville Blower (Canada) Ltd., 629 Adelaide St., W., Toronto, Ont.


Centrifugal and Rotary Positive Blowers and Exhausters • Positive Displacement Meters • Vacuum Pumps • Gas Pumps • Inert Gas Generators • Spiroxal Compressors

PAPER TRADE JOURNAL CLEARING HOUSE PAPER TRADE JOURNAL

HELP WANTED

CONFIDENTIAL EMPLOYMENT SERVICE

For paper and pulp mills and paper converting plants. Our Service is rendered without charge to employers seeking executives. No charge to applicant until position is accepted. We invite your inquiries.

CHARLES P. RAYMOND SERVICE, INC.
Phone: Liberty 2-6547
294 Washington St., Boston 8, Mass. A-1

ASSISTANT TO MILL SUPERINTENDENT

Excellent opportunity for the right man. Must have at least two years experience in maintenance or production. Expanding specialty mill located in southern New England. Mechanical Engineer under 35. Salary open. Replies will be held confidential. Send personal background, work experience, present salary, and education to Box 55-235, c/o Paper Trade Journal. A-8

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC., 663 Brisbane Bldg., Buffalo 3, N. Y. A-1

CHEMICAL ENGINEER AND CHEMIST

Vacancies exist in a large Specialty Pulp and Paper Mill in the Eastern Townships, Province of Quebec. We require one Chemical Engineer and one Chemist. The successful applicants will be employed in the Technical Department. Initially work will consist of technical investigations throughout the mill aimed at increased production and higher quality. The positions offer interesting work with good opportunities for advancement.

Candidates must be recent graduates of a recognized University. Previous experience in the industry is not necessary. Essential qualities are initiative, self-confidence and ability to work with a minimum of supervision.

Apply in writing giving full details of education, experience and career. Naturally all applications will be handled in strict confidence. Address Box 55-231 care Paper Trade Journal. A-8

MECHANICAL ENGINEER

Graduate Mechanical Engineer experienced in the operation of Fourdrinier paper machines, refining and related equipment for large expanding and progressive mill in Middle Atlantic States. Under 35 years of age. Good salary and excellent opportunity for advancement. Give detailed resume of experience. Send resume to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland OAM

MACHINE DESIGNER: Experienced in Paper Coating Machines. HAIDA ENGINEERING CO., 34-11 Vernon Blvd., Long Island City, N. Y. A-8

HELP WANTED

EXECUTIVE ASSISTANT

Sales and office management New York firm selling testing equipment to paper and allied industries—acquaintance with quality control and laboratory instruments desirable—reply with resumé to Box 55-239 care Paper Trade Journal. A-1

AN OPPORTUNITY

Small cylinder mill in middle west needs night tour boss or assistant supt. Must be conversant with all phases of board mill operations and finishing room. A small city with good living conditions. A splendid chance for a man who is looking for a bright future. Address Box 55-238 care Paper Trade Journal. A-22

COATING CHEMIST

Excellent opportunity for graduate chemist or chemical engineer with experience in clay coating of enamel and machine coated printing papers. Must be capable of organizing plant scale development work. Location — Mid-West. Address Box 55-120 care Paper Trade Journal. TF

PRODUCT DEVELOPMENT SPECIALIST

For development of new products and improvement on present grade including white paper, converting stocks, board and coated papers. College graduate with strong background and related experience in the above fields. Usual benefits plus excellent opportunity. Send resume to Personnel Director, West Virginia Pulp & Paper Co., Luke, Maryland. 8-12

WANTED

YOUNG MAN EXPERIENCED IN LATIN AMERICAN PAPER EXPORT BUSINESS MUST BE CAPABLE SPANISH CORRESPONDENT. GOOD OPPORTUNITY FOR ADVANCEMENT. SEND COMPLETE DETAILS YOUR BACKGROUND. BOX 55-232 CARE PAPER TRADE JOURNAL. A-8

POSITIONS OPEN

Opportunities for Tour Boss and Machine Tender in expanding board mill in upper New York State. Folding or set-up experience preferred. Write stating background and expected earnings. Columbia Box Board Mills, Inc., Chatham, New York. TF

EXPERIENCED HYDRAULICS ENGINEER WANTED

Graduate engineer experienced in paper mill hydraulics, planning and development of piping lay-out systems, etc. for large expanding and progressive mill in Maryland. Good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland OAM

Large specialty paper mill in Northern Wisconsin has an immediate opening, with good advancement possibilities, in its main mill laboratory, for an aggressive chemist or chemical engineer. Age 23-35 with previous experience in pulp, paper, or converting desirable, but not mandatory. Please include training, experience, and salary requirements in your reply. Address Box 55-204 care Paper Trade Journal A-1

HELP WANTED

SANITARY ENGINEER

Opportunity available for Sanitary Engineer in an expanding pulp and paper mill located in the Middle Atlantic States. Age 25-35 years. Require man experienced in paper mill waste, paper mill stream pollution and paper mill water purification. No other experience will be given consideration. Good salary and advancement. All replies confidential. Send resume of educational background and industrial experience to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland OAM

BOARD MILL

Young Men Wanted—Experienced

MACHINE TENDER
MASTER MECHANIC
MILLWRIGHT
ASSISTANT MILL MANAGER

Address: 55-223 Paper Trade Journal

MACHINE TENDER WANTED

Qualified man for six cylinder board machine making high grade folding boxboard in New England. If available write age, education and experience to Box 55-228 Paper Trade Journal. A-8

HEATING & VENTILATING ENGINEER

Graduate Engineer experienced in all phases of paper mill heating and ventilating air conditioning and refrigeration for large expanding and progressive mill in Maryland. Under 35 years of age, good salary, all benefits and excellent opportunity for advancement. Send detailed resume of experience and education to

Director of Personnel
West Virginia Pulp & Paper Company
Luke, Maryland OAM

WANTED

Master mechanic for 2 Machine Board Mill in East to take charge of our maintenance and new construction work. Must be experienced with late type machines. Big pay, excellent opportunity. Give resume of education and experience with salary expected. Reply to Box 55-152 c/o Paper Trade Journal. TF

SITUATIONS WANTED

MARKET RESEARCH ANALYST

Research in paper and paper board fields toward development of new grades and improvement in present grades. College graduate, printing or paper experience in operations or sales. Usual benefits with excellent development opportunity. Age to 40. Send resume to Personnel Director, West Virginia Pulp & Paper Co., Luke, Maryland. 8-12

Technical sales service position desired. Graduate of New York State College of Forestry. Age 29. Four years' experience in research and product development on Fourdrinier and cylinder machine papers. No previous sales experience. Currently employed. Reply Box 55-237, PAPER TRADE JOURNAL. A-8

FOR SALE

BARKING DRUM
1—10′ x 30′.

BEATERS
1—Noble & Wood beater roll and stand. 70″ diameter x 44″ face.
2—1500 lb. rag beaters, Valley Iron, bandless rolls, 54″ x 48″, cast iron tubs, with motors.
Write us regarding your requirements.

BREAKER STACK
1—110″ face 2 roll breaker stack, with frames.

CALENDER STACKS
1—3 roll 30″ face friction Calender Stack (Holyoke), 2 iron rolls, 1 cotton roll and 1 spare cotton roll.
1—4 roll 72″ Calender Stack. (Extra heavy duty).
1—5 Roll 86″.
1—5 Roll 90″.
1—9 Roll—86″ face, Super Calender Stack.

CHIPPERS
1—96″ Murray 6 knife chipper, complete with 300 H.P. synchronous motor.
1—88″ Carthage 4 knife Chipper.
1—96″ Murray 4 knife Chipper—anti-friction bearings.
1—84″ Carthage 4 knife Chipper.

CLASSIFINER
1—Dilts Classifiner, practically new, with motor.

CORE MACHINE
1—Dietz Core Machine (Tube Winder).

CREPER AND WAXER
1—80″ Creper and Waxer, excellent condition, details on request.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.

CYLINDER MOLDS
2—30″ diameter x 72″ face.
1—30″ diameter x 92″ face.
2—36″ diameter x 54″ face.
2—36″ diameter x 84″ face.
2—36″ diameter x 86″ face, with vats.
3—36″ diameter x 90″ face.
4—36″ diameter x 110″ face.

DIGESTERS
2—14′ Globe Rotary Digesters.

DRIVES
1—Link Belt, 300 HP, ratio—1.51 to 1.
1—Jones 21 H. P., ratio 10 to 1 (enclosed angle drive)
1—#4 Reeves Drive.
1—Vaughn 100 h.p. enclosed angle drive. Ratio 7 to 1.
2—Cleveland agitator drives, for chests.
2—Waterbury Hydraulic Variable speed line shaft drives (from 40 to 100 h.p.).

DRYERS
1—Complete unit, consisting of 6 dryers, 36″ diameter x 38″ face, including frames, gears, anti-friction bearings.
5—24″ diameter x 54″ face, with bearings.
1—28″ diameter x 48″ face.
5—28″ diameter x 80″ face with anti-friction bearings.
9—36″ diameter x 44″ face with frames, gears & bearings.
1—36″ diameter x 66″ face.
1—36″ diameter x 67″ face.
15—36″ diameter x 72″ face.
6—36″ diameter x 76″ face.
4—Dryers 36″ diameter x 84″ face, with bearings, gears & frames.
1—36″ diameter x 90″ face.
1—36″ diameter x 120″ face.
1—48″ diameter x 70″ face.
1—48″ diameter x 100″ face.
1—48″ diameter x 106″ face.
2—Dryers 48″ diameter x 134″ face.
1—48″ diameter x 144″ face.
1—62″ diameter x 67¾″ face, bearings.
3—60″ diameter x 86″ face.

DYNOFINER
"Rice Barton," details on request.

EMBOSSING CALENDERS
1—45″ Meadows 2 roll embosser.
1—32″ Cavagnaro 2 roll embosser.
Write us regarding your requirements.

EXTRACTOR ROLLS
1—Extractor roll, 26″ diameter x 104″ face. with rubber couch roll.
1—Rice Barton & Fales Extractor Roll, 26″ diameter x 104″ face, with rubber couch roll.

FLAT SCREENS
2—12 plate Flat Screens.
2—14 plate Packer, roller shoes.

GEARS
Write us regarding your requirements.

GRINDERS
2—4 pocket Grinders.
2—3 pocket Grinders.

JORDANS
1—#1 Jones High Speed with 75 h.p. motor.
1—#4 Emerson Jordan, anti-friction bearing.
1—#5 Miami Jordan with or without300 HP synchronous motor.

LABORATORY EQUIPMENT
1—Marcy Rod Mill.
Write us regarding your requirements.

LAMINATING MACHINE
1—72″ Hudson-Sharp laminating machine. reverse coater.

MOTORS
2—150 H.P. Westinghouse 495 R.P.M. 3/60/440.
1—50 H.P. Upright motors, air cooled 3/60/440, 1150 R.P.M. (Ball Bearing).
Write us regarding your requirements.

PRESSES
Write us regarding your requirements.

PRESS ROLLS
1—Chilled iron, chrome plated, 12″ x 100″
1—Chilled iron, chrome plated, 10″ x 74″

PULLEYS
Various cone and assorted pulleys.

PULPERS
1—Jones Pulper.
1—Jones Pulp-Master.

PUMPS
5—Shartle Bros. Agiflow circulating pumps.
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

RAG CUTTERS
Write us regarding your requirements.

REELS
1—86″ 2 bowl reel.
1—84″ 3 bowl revolving reel.
1—100″ Rice Barton 2 bowl Reel, heavy duty.
1—123″—3 bowl revolving reel.
1—134″—2 drum.
1—72″ Dowingtown Reel, 2 bowl.

REFINER
1—12″ Wiener Refiner.

ROLLS
1—Rubber Couch Roll—20″ diameter x 108″ face.
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber, Iron, etc.)

ROTARY SCREEN
1—Bird, 36″ diameter cylinder x 50″ long plate, enclosed drive.
Write us regarding your requirements.

SAVEALLS
2—Sandy Hill, 36″ diameter x 80″ face cylinder molds, anti-friction bearings and couch rolls.

SCREEN PLATES
Bird Rotary Plates Available.
Write us regarding your requirements.

SHAKE
1—Bevis Fourdrinier Shake.

SHEETERS
1—42″ Finlay Sheeter.
1—60″ Hamblet.
1—72″ Hamblet Sheeter.
1—140″ Hamblet (Simplex).
1—140″ Hamblet (Duplex).
1—100″ Hamblet Sheeter (Duplex) with layboy, backstand, etc.

SHOWERS
5—Bird showers 96″ face.

SLITTERS & WINDERS
1—42″ Cameron—Type 9.
2—42″ Cameron—Type 6.
2—42″ Cameron—Type 24-3A.
1—50″ Cameron—Type 6.
1—50″ Cameron—Type 24-2AL.
2—52″ Cameron—Type 10, constant tension unwind stand.
1—62″ Cameron Type 6.
1—62″ Cameron—Type 40-1-AF.
1—62″ Cameron (duplex)
2—72″ Cameron—Type 10.
1—40″ Fales Slitter.
2—86″ Two Drum Moore & White, 50″ diameter rewind.
1—120″ Moore & White, 4 drum winder.

SLITTING DEVICE
84″—Quick change slitting device shear cut, complete, practically new.

STOCK PUMPS
1—8 x 18 Shartle Triplex.
2—10 x 10 Beloit Duplex, low type.
2—10 x 20 Shartle Triplex.
1—12 x 20 Shartle Triplex.
1—20″ x 20″ centrifugal Shartle, 12,000 G.P.M. (new)
Advise as to your requirements.

SUCTION BOXES
Write us regarding your requirements.

SUCTION COUCH ROLL
1—36″ diameter x 246″ face, SKF bearings.

SUCTION COUCH SHELL
1—Downingtown suction couch shell only, 130″ face x 24″ diameter.

SUCTION PRESS ROLLS
1—Sandusky Suction Press Roll 130″ drilled face x 14⅞″ diameter.
1—Sandusky Suction Press Roll 162″ drilled face x 22″ diameter with roller bearings.
1—Sandusky Suction Press Roll, 83″ face x 22″ diameter. Rebuilt like new.

SUCTION PRESS SHELL
1—Beloit rubber covered suction press shell 19¼″ diameter x 100″ drilled face.
1—Downingtown rubber covered suction press shell only, 130″ face x 24″ diameter.

TABLE ROLLS
22—Rubber Covered 10″ diameter x 246″ face. Write us regarding your requirements.

THICKENERS
Write us regarding your requirements.

TOILET WINDERS
2—72″ Hudson-Sharp (Surface type winder).
4—81″ Dietz.

TRIMMERS
1—63″ Oswego cutter.
1—60″ Guillotine cutter.
1—44″ Seybold.

VACUUM BOX
1—Gilbert & Nash vacuum box, 122″ face.

VACUUM PUMPS
2—L-5 Nash's.
2—L-6 Nash's.
2—L-7 Nash's.
1—#4 Nash Hytor.
1—#8 Nash Hytor.

VATS
2—D. J. Murray Company Vats, iron ends, for 42″ x 120″ cylinder molds, overflow and counterflow.

VIBRATING SCREEN
1—Tyler Niagara Vibrating Screen, practically new.

WET MACHINE
1—72″ Wet Machine.

YANKEE DRYERS
3—108″ diameter x 72″ face.

Paddy Ross, Pres.
377 Frelinghuysen Ave.*

J. J. ROSS COMPANY

Tel.—Bigelow 3-3720

Ben Kurs, Treas.
Newark 5, N. J.

SITUATIONS WANTED

Paper Export man, 36 years young, experienced world markets. Presently employed, seeking wider opportunity preferably with mill. Heavy administrative background. College Graduate, married. Address Box 55-233, Paper Trade Journal.
A-8

SUPERINTENDENT and Master Mechanic desires change. Proven ability, guarantee to increase your production and cut operating costs with your present equipment. 45 years combined experience with Fourdrinier, Yankee and cylinder machines on all grades of paper and phases of maintenance. Address Box 55-224 care Paper Trade Journal. A-8

MILL EXECUTIVE—Wide experience manufacturing paper and board in all grades on Fourdrinier or cylinder. Stock preparation, coating, finishing, converting. Graduate paper engineer. Exceptionally able organizer. Eager collaborator. Seeks full charge in production, development, control or adviser to top executive. Capable of assuming responsibility. Highest calibre references. Address Box 55-225 care Paper Trade Journal. A-1

PRODUCTION MANAGER, General Supt. or Paper Mill Supt. wishes change in 12 to 14,000 range. 30 years experience nearly all Fourdrinier grades, some cyl. Will go anywhere. Welcome foreign service. Address Box 55-234 care Paper Trade Journal. A-22

FOR SALE

FOR SALE

1—3-COLOR KIDDER ROTARY PRESS, roll to roll, 72" wide, 40" repeat with 220 volt, 60 cycle, 3 phase motor equipment. On our floor ready for immediate shipment.

Thomas W. Hall Co.
Stamford, Conn.
TF

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New Improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester 11, N. Y. TF

FOR SALE
IMMEDIATE POSSESSION

Complete Tissue Mill with 81" trim single cylinder machine with enclosed drive. Complete stock preparation and converting machinery.

Brick and Cement block buildings, 35,000 square feet, plus five acres of land. 500 h.p. water power with generators, plus 1000 h.p. water power additional.

Railroad siding on property.
Location: Phoenix, N. Y.

ROSS PAPER MACHINERY CO.
265 Passaic Street, Newark, N. J.
Tel. HUmboldt 2-2177
TF

FOR SALE

22 New Koppers Shaft Couplings for 2", 2½" and 3-7/16" shafts with keyways.

Thomas W. Hall Co.
Stamford, Conn. TF

FOR SALE

62" Finley Sheeter & Layboy
72" Hamblet Sheeter
96" Moore & White Sheeter & Layboy and 8-roll backstand
108" Horne Sheeter
50" Cameron Type 6 Slitter
72" Dietz Shear cut Slitter
84" Moore & White 2-drum Rewinder
112" Langston Slitter and Rewinder
72" Maxson Overlapping Layboy, delivery sheet 36" wide up to 58" long
Single and Multiple Back Stands

FLAT CUTTERS

36" Sheridan New Model
40" Seybold 10-Z
57" Dexter Power Cutter
63" Oswego Power Cutter
74" Seybold Dayton Mill Type Cutter
Industrial Shredder

Many other items used for paper converting.

Thomas W. Hall Company Stamford, Conn. TF

IMMEDIATE DELIVERY
Subject to Prior Sale
Clark-Aiken Goebels HSSI

62" ROLL SLITTER and REWINDER

Suitable for Slitting
Paper, Film, Foil Fabric
for Tape, Shop Counter or
Automatic Packaging
Machine Rolls

High-speed shear-type cutters. Rugged construction and roller bearings for high-speed operation with low maintenance. Fast, easy loading and unloading.

Takes rolls up to 62" wide and 35" diameter. Maximum rewind diameter, 31". Approximate speed, 2500 feet per minute. Will slit to 1½" wide.

Complete accessory equipment for this slitter is available.

Write, wire or phone for price and details

The Clark-Aiken Co.
155 Springfield Rd. Phone: Lee 700
LEE, MASSACHUSETTS
TF

FOR SALE

3—9 ft. x 17 ft. Blaw Knox rotary digesters, with enclosed drives, used 6 months.
3—Johnson screens, S.S.
2—Bird 3-A screens.
10 knife Murray 96" chipper.
6 knife Murray 96" chipper.
6—14 plate Impco bronze vat flat screens.
12—16 plate Impco bronze vat flat screens.
2—Beloit enclosed drives units, 3 to 1 ratio.
108" Beloit Pope type reel.
30—Dryers 48" x 132".
28—Dryers 48" x 144".
30—Dryers 48" x 104".
21—Dryers 36" x 96".
26—Dryers 36" x 84".
17—Dryers 60" x 164".
12 ft. x 132" Beloit Yankee dryer.
8 ft. x 74" Yankee dryer.
6 ft. x 60" Yankee dryer.
Beloit Fourdrinier, new 1936, anti friction, wire 153" x 70 ft. 3½".
Rice Barton Fourdrinier, wire 145" x 70 ft. 5".
80" Laminating Machine.

FRANK H. DAVIS COMPANY
175 Richdale Ave., Cambridge 40, Mass.
TF

FOR SALE

NASH VACUUM PUMPS
FULLY GUARANTEED
L-5 L-6 L-7

J. J. ROSS COMPANY
377 Frelinghuysen Ave., Newark, N. J.
Tel: Bigelow 3-3720
A-1

WANTED

WANTED

A large two machine Board Mill located in Midwest which manufactures high grade folding box board will consider applications of young men with practical experience on cylinder machines. Some technical training desirable. Will train for Tour Boss and Shift superintendent. Address Box 55-218 care Paper Trade Journal.
A-1

We Solicit

Specialty Coating Jobs. Solvent or Emulsion Type Coatings—Clear or Colors. Roll Widths up to 60". Roll Printing up to 60". Roller Embossing up to 44". Hot Melt Coating up to 36". Pyroxylin Metallic Papers. Box Lining Papers. General Converting, Laminating and Die Cutting Services.

PAPER CONVERTING & FINISHING CO.
118 N. Ada St., Chicago 7, Ill.
Phone—Haymarket 1-7901
TF

WANTED

PACKER TYPE FLAT SCREEN FOR TAILINGS 6, 8 or 10 PLATES.

ADVISE CONDITION, PRICE AND LOCATION

Box 55-238 c/o Paper Trade Journal.
A-8

WANTED—Dryers, 74" to 84", with gears, frames and bearings. Paper machine drives and clutches. Calender stacks, about 80" wide. Machine speed tachometers. Address Box 55-236 care Paper Trade Journal. A-22

ROSS PAPER MACHINERY COMPANY

CABLE ADDRESS
JACKROSS

265 PASSAIC STREET • NEWARK 4, NEW JERSEY

BUY WITH CONFIDENCE — RPM SINCE 1919 — SELL WITH CONFIDENCE

USED PAPER MAKING & CONVERTING MACHINERY

Humboldt 2-2177

IMMEDIATE DELIVERY FROM AMERICA'S LARGEST INVENTORY OF PAPER MACHINERY

AGITATOR DRIVES
1—Foote Bros.—enclosed 15 h.p.—ratio 33 to 1.

BACKSTANDS
Hamblet Backstands for any number of rolls. Single or double deck.

BALERS
1—Buffalo Baling Press—upstroke.

BEATERS
1—Dilts high speed iron tub. Roll 62" dia. x 54" face with 75 HP motor & controls.

CYLINDER MOULDS
1—76" face x 48" diameter.
3—136" face x 54" diameter—stainless steel covering—with 2 iron end vats.

CALENDER ROLLS
46—Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—Black Clawson 90" 7 roll with 3 spare rolls.
1—Black Clawson 82" 3 roll with doctors.
1—Black Clawson 82" 5 roll with doctors.

DRIVES
3—Reeves #2F, #3 and #6.
8—Enclosed drives—various sizes.
1—DeLaval enclosed right angle 30 h.p. ratio 13 to 1.
1—DeLaval enclosed right angle 15 h.p. ratio 13 to 1.

DRYERS
7—43" face x 36" dia.—frames, gears & bearings.
17—46" face x 48" dia.—gears, bearings and steam joints.
4—52" face x 48" diameter—gears & bearings.
1—52" face x 24" diameter—gears & bearings.
17—73" face x 36" dia.—frames, gears & bearings.
28—84" face x 36" diameter, with gears.
1—88" face x 36" diameter.
9—100" face x 48" dia.—with gears, 2 deck frames, bearings.
1—102" face x 48" diameter.
1—104" face x 36" diameter.
1—104" face x 48" diameter.
10—109" face x 42" diameter.
1—110" face x 42" diameter, with bearings.
1—116" face x 36" diameter.
1—116" face x 48" diameter.
15—120" face x 48" diameter with gears, bearings and felt rolls.
1—124" face x 48" diameter.
1—126" face x 48" diameter.
13—127" face x 42" diameter.
1—130" face x 48" diameter.
9—160" face x 36" diameter, gears & bearings.
48—160" face x 48" diameter. Complete dryer section including felt dryers, felt rolls, etc.
8—178" face x 60" diameter, brand new—for roller bearings.
36—132" face x 42" diameter with gears and bearings.

FLAT SCREENS
3—8 plate Sandy Hill roller shoe with scrapers.
1—Bagley & Sewall 8 plate with scrapers.

FOURDRINIER PARTS
1—Beloit 88" x 80' wire. Removable type, anti friction bearing equipped. Complete with slice, 6 stainless steel suction boxes, etc.

JORDANS
2—E. D. Jones #1 high speed ball bearing Jordans. Direct connected to 75 h.p. GE Motors. Used 1 year.
1—E. D. Jones pony Jordans 3/16" stainless steel fillings.
1—E. D. Jones Pony Jordan, ball bearing, with stainless steel filling.
1—Smith & Winchester standard with granite filling.
1—Noble & Wood Bull Dog Jordan. Anti friction bearings with coupling and motor base.

KNIFE GRINDERS
1—132" Rogers with motor. Used 5 months
1—130" Hanchett belt driven complete with coolant pump, and 2 spare wheels.
1—92" Seybold with motor.
1—Rogers Type CC-3 circular knife grinder. For knives 2" to 20" dia.

LABORATORY EQUIPMENT
1—5 lb. Wood Tub Beater—Complete.
1—Biggs 6' diameter Rotary Digester 100# pressure.

MOTORS
12—125 H.P. Westinghouse synchronous enclosed. Brand new. 440 volt, 720 rpm forced air ventilation with starters.
3—E.M.M. 2800 H.P. 6600 volt 3-phase, 60-cycle 240 RPM Syn. motors, complete with controls, starters, etc.
1—Westinghouse 300 h.p., 388 r.p.m., 440 v., 3 phase, 60 cycle.

PRESS SECTION
3—Complete sections. Rolls 102" face.

PULP EQUIPMENT
1—APMEW ball bearing pulp screen.
3—2 ft. x 8 ft. type 300 Tyler Niagara stainless steel Chip Screens.
1—3 ft. x 8 ft. type 300 Tyler Niagara stainless steel Chip Screens.
1—E. D. Jones repulper with Falk motor-reducer and 60 HP motor.

PULP PRESSES
1—Hydraulic Machine Co. 250 tons 30" x 36" platen, 48" daylight, 30" stroke, 16" ram—upstroke. For baling dry pulp.

PUMPS
44—Centrifugal Pumps open & closed impellers.

REELS
1—Pusey & Jones 162" drum reel.
1—Downingtown 104" 2 bowl reel.

REFINERS
1—#2 Claflin ball bearing. New filling.
1—24" Weiner Refiner—ball bearing.
1—32" Sutherland Refiner #1.
2—E. D. Jones high speed "1 Refiners, direct connected to 75 h.p. motors. Used 1 year.

ROLL GRINDERS
1—Farrel 2 wheel for rolls 32" diameter x 160" face. Complete with crowning attachment, reeves drive and motor.
1—Farrel 2 wheel for rolls 32" diameter x 300" centers. Complete with crowning attachment and motor generator drive.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
14—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

ROTARY SCREENS
3—#2 Bird-Copper vat.
5—Bird #2A with copper vats.
1—Bird #3A—copper vat—2 motors.

SAVEALLS
1—Shartle cylinder 36" dia. x 122" face with 5 HP motor & enclosed drive.

SHEETERS
1—Cameron 124" quick change double slitter assembly for board sheeters. Complete with 16 pneumatic slitters
1—Moore & White simplex 114" sheeter with Maxson Layboy, overlapping delivery, 8 roll backstand motor and starter.
1—Hamblet 100" single knife with 3 slitters.
1—Hamblet 81" duplex with Erie Layboy 12 roll backstand and motor.
1—Hamblet 75" with layboy and backstands.

SHREDDERS
2—Mitts & Merrill Air Fluff Paper Shredder. Used 9 months.
1—Mitts & Merrill #17-2A paper shredder.

SLITTERS AND WINDERS
1—Langston 100" x 48" dia. rewind.
1—Cameron 82" Model 10-5. 30" rewind. Equipped with shear cut slitters.
1—Dietz 81". Parent roll backstand—with automatic tensioning device.
1—Cameron 48" Model 6. Fully rebuilt. New machine guarantee.
1—Cameron 42" Model 6.
1—Cameron 62" Model 9-5.

STEAM TURBINE
1—Terry Steam Turbine 125 HP-160 HP, 50# back pressure. New 1948.

STOCK PUMPS
1—Shartle 10 x 20 single plunger pump.
1—Moore & White 10 x 16 Triplex.
1—Beloit 8 x 10 Triplex.
4—Beloit open impeller pumps 5,000 G.P.M. at 35 ft. head. Anti-friction bearings.
1—Downingtown 8 x 18 triplex, with enclosed drives and motor.
1—Shartle Miami White Water Centrifugal. 300 g.p.m. at 42' head. Direct connected to 10 h.p. motor with controls.
1—Bagley & Sewall 12 x 20 Triplex.

SUCTION COUCH ROLLS
1—Sandusky suction couch 25" diameter x 128" drilled face.
1—Sandusky suction couch 18" diameter x 122" drilled face.

TRIMMERS POWER BACK GAUGES
1—Seybold 94" Model 15 ZJ.
1—Seybold 84" Dayton with motor and spare knives.
1—Seybold 74"—Model 12 ZG.
1—Seybold 74"—Model 8ZG with motor.
1—Seybold 64"—Dayton with motor.

VACUUM PUMPS
1—Connersville 2.1 cu. ft. per rev. With base.
2—Connersville 1.65 cu. ft. per rev. With base.
1—Connersville .75 cu. ft. per rev. With base.
1—Connersville Type RSB. With base.
1—Nash H-3 with 5 h.p. motor.
3—Nash H-4.
1—Nash L-3 with totally enclosed 5 h.p. motor.

VOITH INLETS
2—Valley Iron Voith Inlets, adjustable 83" to 86"—Brass lip, stainless steel apron.
1—Valley Iron Wks. 116" stainless steel inlet, complete with 14" diameter distributor roll.

VORTRAPS
1—1½" Stainless Steel with valves.
7—Nichols 4" stainless steel Vortraps—rubber lined heads.

WASHER
1—Impco 3 stage washer, cylinder 84" face x 42" dia., 20" dia. rubber couches, 2 agitator sections, all individually motor driven. Used 1 year.

WET MACHINES
1—Black-Clawson 96" wet machine, cylinder 36" dia. with rubber couch. Complete with drive and motor.
1—Black-Clawson 72" wet machine, cylinder 36" dia. with rubber couch. Complete with drive and motor.
2—Rogers 72" x 48" Wet Machines. Double press sections.

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